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A
PRACTICAL SYSTEM
OF
SURGERY.

A
PRACTICAL SYSTEM
OF
SURGERY.

BY JAMES LATTA,
SURGEON IN EDINBURGH.

ILLUSTRATED WITH CASES ON MANY OF THE SUBJECTS,
AND WITH COPPERPLATES.

IN THREE VOLUMES.

VOLUME I.

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ADVERTISEMENT.

THE Author of the following publication has for the last ten years of his life practised as a Surgeon in Edinburgh. Previous to his setting up in business, he was, for seven years, employed as Clerk or House-Surgeon in the Royal Infirmary of Edinburgh; a situation highly favourable (with proper attention) to the acquisition of surgical experience.

HE had likewise the singular good fortune of possessing the friendship and patronage of the late Dr William Cullen; and, during a period of fourteen years, had almost daily opportunities of receiving the benefit of the Doctor's conversation and instructions in the line of his profession.

THESE circumstances are mentioned as some apology for the Author's venturing to obtrude himself upon the notice of the Public. He has flattered himself with the hope,
that,

that, taking advantage of the opportunities he enjoyed, he has been able to make some improvements on several branches of Surgery ; both in regard to the general mode of treatment, and more particularly in what relates to operation.

HE has farther to solicit the indulgence of his readers for those defects in style and composition which may be discovered in the following pages : That being a subject to which the Author's habits of life have not permitted him to pay sufficient attention.

THE second Volume is in the Press, and the last will be published as soon as the Author can overtake it.

THE FOLLOWING

WORK

IS RESPECTFULLY INSCRIBED

TO

ALEXANDER MONRO, M. D.

FELLOW OF THE ROYAL COLLEGE OF
PHYSICIANS :

FELLOW OF THE ROYAL SOCIETY ;

AND

PROFESSOR OF PHYSIOLOGY, ANATOMY,
AND SURGERY, IN THE UNIVERSITY
OF EDINBURGH ;

IN TESTIMONY

OF THE HIGH SENSE ENTERTAINED BY THE
AUTHOR OF HIS UNEQUALLED IM-
PROVEMENTS IN THESE
SEVERAL SCIENCES.

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A
PRACTICAL SYSTEM
OF
SURGERY.

CHAPTER I.

OF BLOOD-LETTING.

BY this operation is understood the taking away of some part of the red blood circulating in the arteries and veins, either with a view to lessen the quantity of the general mass, or to relieve a particular part.

Hence we have naturally two divisions of this operation, one which may be called *General*, the other *Topical*.

General blood-letting is always performed with a lancet, and is likewise subdivided into two kinds, viz. the opening of a vein, termed *Phlebotomy*,

or of the temporal artery, or a branch of it; which last operation is termed *Arteriotomy*.

Topical blood-letting is performed, either by means of a cupping-glass and scarificator, by leeches, or by several punctures made with a lancet; and is done in various parts of the body, according to the nature of the disease which it is intended to remedy.

SECTION I.

OF PHLEBOTOMY.

THE mode of blood-letting most usually practised, is the opening of a vein; and this has been done in the arm, the ancle, the jugular vein, the frontal vein, the veins under the tongue, on the back of the hand, &c.; but the veins most usually opened are those of the arm, the neck, and the ancle; the last principally in women. In whatever part of the body, however, venesection is performed, the same general method must be practised, viz. to compress the vein by a ligature betwixt the place where the puncture is to be made, and the heart. Thus the reflux of the blood through the vein is stopped, the vessel swells, becomes conspicuous, and bleeds freely, which it would not

not do were the ligature not to be applied. Hence, according to the situation of that part of the body where the vein is to be opened, with regard to the heart, the ligature must be applied either above or below the puncture. In the arm and ankle, where the blood flows upwards to the heart, the ligature must be tied above the intended place of the puncture; but, in the jugular veins, or any vein in the head, where the blood descends, it must be tied below it.

All the apparatus necessary for blood-letting, on the part of the patient, is a bandage or fillet of silk or linen, two or more small compresses of folded linen, a vessel to receive the blood, and a little clean water and cloth. The bandage ought to be about a yard in length, and near two inches broad, a common ribbon or garter being frequently made use of; and the compresses are easily made, by twice doubling a bit of linen rag about two inches square. On the part of the surgeon, it is necessary to be provided with a very clean and sharp lancet of a proper shape. The shape of this instrument is a matter of some consequence, though till lately this circumstance does not seem to have been properly attended to. The lancets formerly used were generally broad-shouldered, by which means the wound in the skin and cellular membrane

brane was made very considerably larger than that in the vein ; which, giving the patient unnecessary pain, frequently rendered it very difficult to stop the blood ; and, besides, subjected the part to the danger of partial suppurations. All these circumstances, however, are avoided by the use of the spear-pointed lancet, represented Plate I. Fig. 1. An instrument of this form readily penetrates the skin and vein with very little pain to the patient ; the wound in both is made very nearly alike in size, and the blood is easily stopped.

In blood-letting, it is necessary to attend to the posture in which the patient must be kept during the operation ; and this will be different, according to the different intentions with which the blood is taken away. If the design is merely to empty the vessels a little, when there is suspicion of plethora, we ought to be careful to prevent fainting. This object is best attained by bleeding the patient in a recumbent posture ; which ought always to be chosen where he is fearful, or apt to faint from the loss of a small quantity of blood. But, where the person is strong and vigorous, there is little occasion for this precaution, and a sitting posture is to be preferred, which indeed is the posture generally chosen. In some cases, however, particularly in the strangulated hernia, it is necessary

ry to induce fainting, that, by the sudden and general collapse of the system, the parts affected may contract, and be more easily reduced. In this case the patient is to be bled in an erect posture, and the wound to be made large, that the blood may flow with the greater velocity. But, for a similar reason, if we wish to avoid fainting, we should avoid making a large orifice.

It has been generally the custom for surgeons to stand while performing this operation, but the latest and best practitioners recommend a sitting posture for both surgeon and patient. The operator ought also to be able to use the lancet either with the right or left hand, because in that case either arm of the patient will be alike to him; whereas, if he can use but one hand, he will operate awkwardly on the opposite arm of the person he bleeds.

In the operation of blood-letting, the first thing to be done, as we have already observed, is to apply the ligature. This, when blood is to be drawn from the arm, must be tied a little above the elbow. It is to be made so tight that the passages of the blood through all the superficial veins may be intercepted; but we must by no means tighten it to such a degree as to compress the artery; because this would effectually prevent the veins from rising at all, by
de-

depriving them of the blood, which ought to make them swell. By this ligature all the veins in the arm will be compressed and swell, when the operator will easily be able to distinguish that which is most convenient for bleeding.

When blood is to be drawn from the jugular vein, we cannot so conveniently apply the ligature, because there is danger of stopping the patient's breath. There is, however, a necessity for compressing *all* the superficial veins here, as well as in the arm; for if one of them is left uncompressed, the blood will all flow through it, without filling up any of the rest in a proper manner. When blood is to be taken from the jugular vein, therefore, it will be proper for the surgeon to make choice of one of the veins previous to his attempting the operation, then to put a compress of linen upon the vein of the opposite side, tying it tight with a ligature under the arm-pit; that is, if the surgeon makes choice of the right jugular vein, he must put a compress on the left one, and tie it under the right arm-pit. Thus the reflux of the blood through these veins will be checked, and they will swell as much as is necessary, without any of that disagreeable strangulation occasioned by a ligature round the neck.

When it is thought proper to draw blood from any of the veins of the foot, the ligature
is

is to be applied a little above the joint of the ancle, in consequence of which, the veins both on the inside and outside will appear very conspicuous, being covered only with skin, and pressed by the ligature against the bones. In like manner, wherever we intend to let blood, the ligature is to be applied to that part where the veins are most exposed, and can be most easily compressed against the subjacent bones or solid parts.

Having applied the ligature properly, the next thing to be considered is the choice of the vein; and this is attended with more difficulty in the arm than any where else. The danger here arises from the vicinity of a nerve, tendon, or artery; the puncture of any one of which would be attended with very alarming consequences. There are four veins in the arm, at the place where blood is commonly drawn; viz. the cephalic on the outside, the basilic on the inside, and the median basilic, and median cephalic between them; the two last being sent off from a trunk called *mediana major*. This trunk runs up the fore-arm, between the cephalic and basilic, dividing into two large branches, one of which runs into each of the others, from which they take their names of median basilic, and median cephalic. Of these the median cephalic is the safest, and next to it the
median

median basilic. The basilic is dangerous on account of its lying directly above the artery and tendons of the biceps muscle. The cephalic is surrounded with the branches of the cutaneous nerve. In general, we are to make choice of that vein which rolls least under the skin, and by reason of its firmness appears to have some connection with the subjacent parts. Veins of this kind, though lying at a considerable depth, are more easily opened than those which roll much, by reason of their having no connection with the cellular texture. The difficulty with loose veins, however, may in a great measure be overcome by the steadiness of the operator. When he finds that the vein rolls much, he ought to stroke up the skin with the ligature before he ties it. He must then put the thumb of his left hand (if he operates with the right) upon the vein, about an inch and an half below the place where he intends to make the orifice; but if the vein rolls much, the distance must be diminished even to half an inch.

The ligature being tied, the operator is next to take the lancet, bent to a somewhat acute angle, between the thumb and fore-finger, leaving one half of the blade uncovered, and resting the hand upon the other three fingers, he is to enter the lancet in an oblique direction, pushing the point through the skin, cellular substance, and

and vein, till the blood appears on each side of the lancet. Then raising up the point in as straight a line as possible, he makes the wound in the skin and vein quite equal, as they ought to be. The operator then takes off his thumb, and allows the blood to run freely, till the desired quantity is taken. The arm ought to be kept in the same position during the whole time the blood flows; otherwise there will be danger, lest the skin slip over the orifice of the vein, in such a manner as totally to impede the efflux of blood, which thus would insinuate itself into the cellular substance, and occasion a great deal of trouble.

Having taken away the proper quantity of blood, the ligature should be instantly unloosed; and that this may be done with the greater facility, it should be tied at first with a slip-knot: Upon untying it, the discharge of blood generally ceases; though sometimes, when the orifice is large, and the circulation very vigorous, the blood will flow with great rapidity even after the ligature has been removed, and the compresses applied. In this case the vein must be compressed, both above and below the orifice, with the fore and middle finger of the operator's left hand, the arm washed clean from the blood, the sides of the orifice laid close together, and any blood which may re-

main in the wound pressed out, by working the vein a little between the fore-fingers of both hands ; after which the linen comprefs, formerly described, is to be put upon it, and secured by a linen roller put round the arm in the form of an eight figure, always crossing immediately above the comprefs. Thus the wound will be healed, by what surgeons call the first intention, that is, by the adhesion of the parts to each other without any suppuration.

In opening the jugular vein, the patient's head is to be laid to one side, and properly supported ; then the operator is to press upon the vein with his thumb in order to make it swell ; the lancet is at once to be pushed through the integuments and skin, till the blood begins to appear, as in the arm ; but here it is necessary to go much deeper than in the arm, as the veins are very deeply seated ; and there is not here any reason to fear the wounding of either arteries or tendons ; neither, by reason of the perpendicular descent of the blood through these veins, is there commonly any difficulty in stopping the flux after the pressure is removed. Though some practitioners have directed a scalpel to be used for dividing the integuments, previous to the opening of the jugular vein, yet this is so evidently improper, that it is not only disused by regular surgeons, but even by gardeners,

ers, who practice bleeding mechanically, without knowing by what rules they operate. The reasons are obvious. There are numbers of people so extremely timorous, that they can scarce be made to submit to the operation at any rate; and much more unwilling they would undoubtedly be, were they assured that they must submit to a double incision.

Blood-letting in the feet is performed in the same manner as in other parts; but the blood from the veins there always runs somewhat more slowly than from the arm; whence it has been always customary to immerse the feet and ankles in warm water, after performing the operation, in order to promote the flux of blood. This, however, seems to be unnecessary, as without such assistance there is no difficulty in obtaining a sufficient quantity of blood. The mixture of the blood with water, in the other method, also prevents the operator from knowing how much is taken away, which cannot but be accounted a very great inconvenience, and certainly is a sufficient objection to the practice. In these veins the flux of blood is so weak, that it usually stops without any other assistance than a compress.

In some cases, it has been judged necessary to open veins where we cannot apply any ligature, as those below the tongue, &c. In this case, the only thing that can be done, is to make an
orifice

orifice of a proper size in the vein, where it can be seen most evidently; and if the blood does not thus flow with sufficient freedom, we may, with propriety, make use of the method above mentioned with respect to the veins of the foot, viz. the immersion of the parts in warm water.

SECTION II.

OF ARTERIOTOMY.

THE blood which flows in the arteries being of a different nature from that in the veins, it has been supposed, that the abstracting a quantity of blood from an artery is much more efficacious, in fulfilling the intentions of blood-letting, than taking it from a vein. So impetuous is the stream of blood from an artery, however, and so difficult to be restrained, where the vessel is of any considerable size, that though the opening of some of the larger arteries has sometimes been proposed, no practitioner, however bold, has ever ventured to perform this operation. The only arteries, therefore, from which blood is taken, are the trunk or branches of the temporal artery, the branches of which lie so near to the parietal and frontal bones, that they can easily be compressed against them, and the flux
of

of blood stopped without difficulty. If this artery lies very near the surface, the opening may be made at once with a lancet, as in venesection; but in many cases it lies so low, that it becomes necessary, in the first place, to cut the skin and integuments, and lay the vessel quite open. The puncture is then to be made with a lancet, as if it were a vein, somewhat obliquely, or a little across the vessel; for if it is made quite in the direction of the longitudinal fibres, the sides of the wound collapse, and the blood cannot flow out.

In general, the blood will flow with sufficient freedom from a wounded artery without any compression; but should this happen not to be the case, the compression should be made above the orifice, so that it may intercept the blood flowing out from the heart, and thus augment the flux through the orifice. The blood generally stops very easily; and, at any rate, can be restrained by means of a bandage and compress, as in venesections. Sometimes, indeed, the cicatrix of the wounded artery is apt to give way, and the blood to burst forth from time to time, to the great inconveniency of the patient. In this case, the method of cure most agreeable to the generality of patients, is to obliterate the cavity of the branch of the artery by compression. This is best done by means of a bandage,
such

such as that represented Plate 1. Fig. 2.; but this method has the disadvantage of being tedious. The best method is to divide the artery entirely across at the place where the wound was first made, after which both ends of it retract under the integuments, and the cavity is quickly filled up; the discharge of blood being commonly stopped in a moment by the compression of the integuments under which the divided vessel hides itself; or, if this method should prove ineffectual, it may be taken up with a needle and ligature in the manner afterwards described.

SECTION III.

OF TOPICAL BLOOD-LETTING.

§ 1. By the Scarificator.

THIS instrument is represented Plate 1. Fig. 3. and contains a number of lancets, sometimes as many as twenty, which are fixed in such a manner, that when the instrument is applied to the part affected, the sudden loosing of a spring drives them all at once with a jerk into it; the instrument being also contrived in such a manner, that the depth to which they penetrate may be made greater or less at pleasure. As this instrument

ment wounds none but the smaller vessels only, a very inconsiderable quantity of blood would be discharged, were not some method taken to promote the flux. This is most most usually done by the cupping-glass, of which the simplest form is found to be the best. It is represented Plate 1. Fig. 4. and before it is applied, must have the air within its cavity rarefied by means of heat. This is most easily done by setting on fire a small bit of bibulous paper, dipped in spirit of wine, within its cavity, and clapping the mouth of the glass upon the scarified part, when the paper is nearly extinguished. As soon as it begins to cool, and the air within it, of consequence, to contract, the glass is forced down upon the parts surrounding that which was scarified, and a considerable suction takes place. Thus the blood is made to flow out from the scarifications, in considerable quantity, and the glass receives more or less, according to the quantity of air which had been left in it. A more perfect vacuum might be formed by having an exhausting syringe fitted to the cupping glass; and such instruments have been contrived; but the inconveniences attending the use of them have occasioned the preference to be given to the former.

When the glass has once received as much blood as will flow into it, if more is desired to be

be taken away, it may easily be done, by taking off the glass, emptying it, and applying it again, or another in its place, bathing the scarified part betwixt the applications with warm water*.

In order to procure with certainty the quantity of blood which may be necessary, the part should first be well rubbed with a cloth, and the dry cupping-glass applied as already directed, in order to produce a tumefaction. The scarificator ought to be kept firm in the place by both hands of the operator, that the resistance of the skin to the lancets may not raise it up; and when the operator discharges the lancets, by pressing the button with the thumb of his right hand, he is likewise, with the forefinger of the same hand, to pull forward the handle of the scarificator, in order to assist the action of the spring; as experience has determined, that its strength unassisted is not sufficient to make the wounds deep enough to bleed freely. If, after all, the requisite quantity of blood cannot be obtained, the instrument may be applied a second time to the same place, in such a manner that the wounds now made may cross those made at first; and, if the quantity is still deficient, it may
be

* A vessel made of elastic gum has been proposed, in place of the cupping-glass; but, for various reasons, cannot be preferable.

be applied on another place, as near the former as possible.

In cupping on the temples there is some danger of stopping the circulation entirely, by the pressure of the parts against the bone by the suction of the cupping-glasses. To avoid this, it will be proper to raise up the under edge of it a little, in order to afford a free influx of blood into the part, from the temporal artery and its branches.

The only dressing necessary for the wounds, made by the scarificator, is a piece of linen or charpie, dipped in oil or cream, and applied over the scarified place. As this operation is frequently practised on different parts of the body, it is necessary that a surgeon should be well supplied with cupping glasses of various sizes and shapes, which may be applied to any part.

§ 2. *By Leeches,*

WHEN the parts from which blood is to be drawn are situated in such a manner that the scarificator cannot be applied, or otherwise, it is then necessary to have recourse to leeches. Sometimes it is difficult to make them fix upon the particular spot we wish, but they may be in-

duced to do so by cooling the place with a cloth dipped in cold water, cream, or milk, and confining them upon it by means of a small drinking glass. They are likewise made to fix more readily, by allowing them previously to creep upon a board or dry cloth. After they have fallen off, the common method is to bathe the parts in warm water; but, where a cupping-glass can be applied, it is certainly to be preferred.

§ 3. *By Scarifications with a Lancet.*

THIS operation is chiefly used in violent inflammations of the eyes, and is easily performed, by first causing an assistant secure the upper eye-lid, then, with the fingers of your own left-hand, secure the under lid, and taking the lancet in the other, make a number of slight scarifications in the tunica conjunctiva of the eye, where the vessels appear to be most turgid. Even a few drops, of blood drawn in this manner, have been found of great advantage. In other cases, also, where a scarificator and cupping-glass is not at hand, great advantage is sometimes derived from making a few punctures with a lancet, and applying a common drinking glass as directed for the cupping-glass.

§ 4. *Dry-cupping.*

To these various methods of blood-letting, we may add the operation of simple cupping, which, though productive of no evacuation, has yet been frequently attended with considerable advantages. It is performed by rarefying the air in the cupping-glass by heat, as already directed, and then clapping it on the part affected; by which means a tumor is produced, and the superficial vessels of every kind are distended with blood. For this purpose, a cupping-glass, furnished with a syringe, seems to be preferable to the common kind.

SECTION IV.

*OF THE ADVANTAGES TO BE EXPECTED FROM BLOOD-
LETTING, AND WHEN IT OUGHT TO BE AVOIDED.*

THOUGH this may seem foreign to the subject, in a system of surgery, yet, as it frequently happens that surgeons are called to visit patients in the absence of a physician, and where of consequence they are obliged to act as physicians, it is absolutely necessary that they should
know

know whether it be proper to perform this operation on their patients or not.

The practice of blood-letting has, indeed, been established from time immemorial; but the indiscriminate use of it in all disorders hath undoubtedly been often productive of much mischief; as, on the other hand, in a great number of cases, it is undoubtedly attended with much benefit.

As the nature of blood-letting is to empty the vessels, it follows that it ought never to be performed but where the quantity of fluids is too great, either with respect to the system in general, or to some particular part already affected by disease. Thus, in those fevers called *inflammatory*, where the action of the heart and arteries is greatly increased, the blood circulates rapidly through the whole body, and the general disorder is augmented by the circumstance of quantity; and the taking away a part of it, by giving the vessels more freedom to play properly, contributes very much towards the cure.

Again, in the case of a strangulated hernia, where the intestines are most grievously compressed and inflamed, although the quantity of blood may not, perhaps, be too great with regard to the whole system, yet it is too great for parts in that situation to bear, from causes to be afterwards explained when treating of the cure
of

of that disease; and, therefore, the taking away a quantity of blood, by lessening the pressure upon that particular part, diminishes the disease; and if a very large quantity be taken away, so that the patient faints, the general contraction which takes place all over the system may effect a cure, by the mere diminution of bulk in the parts affected.

The advantages of blood-letting, in all cases of inflammation, must therefore be very apparent; because, as shall afterwards be more particularly explained, there is then a stagnation of the blood in a particular part; and general bleeding, by lessening the pressure of the blood forward upon that part, must undoubtedly diminish the inflammatory affection. In these cases, however, topical as well as general bleeding must be of very considerable use; for, as the latter diminishes the impulse of the circulating blood upon the inflamed part, the former diminishes the quantity of blood in the part itself; and indeed in those cases where the inflammation is not attended with much fever, topical bleeding is found to be more efficacious than the other. Dry-cupping seems calculated to promote the circulation through any particular part, by soliciting the blood and other fluids thither.

As

As blood-letting is of very considerable advantage in those disorders termed inflammatory, it must, of course, be equally prejudicial where the fluids do not bear a due proportion to the strength of the vessels, so as to distend them sufficiently. Hence, it ought never to be practised in low nervous fevers, intermittents, hysterical affections, or nervous disorders of any kind; and it is incumbent upon a surgeon to dissuade patients from the operation when labouring under such disorders, even though they themselves should desire it.

SECTION V.

ACCIDENTS ARISING FROM BLOOD-LETTING.

THE most common of these is a thrombus or echymosis, a small tumor around the orifice, occasioned by the blood insinuating itself into the cellular membrane, between the skin and muscular flesh; and occasioned principally by the shifting of the skin over the vein during the time that the blood flows out from it. There is, however, a possibility of removing the tumor, even during the time of the operation, by untying the ligature, and bringing the member exactly into the same position in which it was before the vein was opened. On applying the li-
gature

Fig. 3.

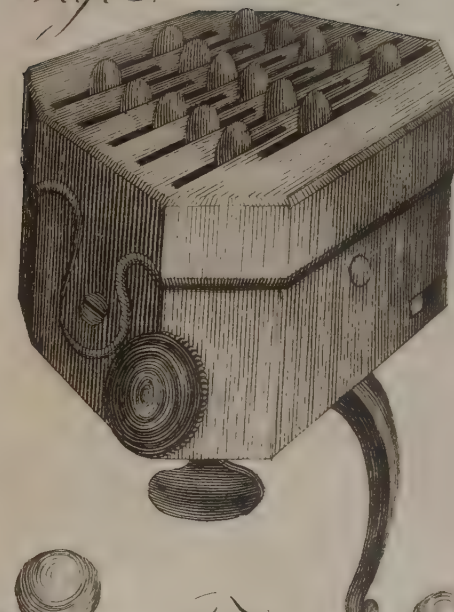


Fig. 1.



Fig. 2.



Fig. 4.

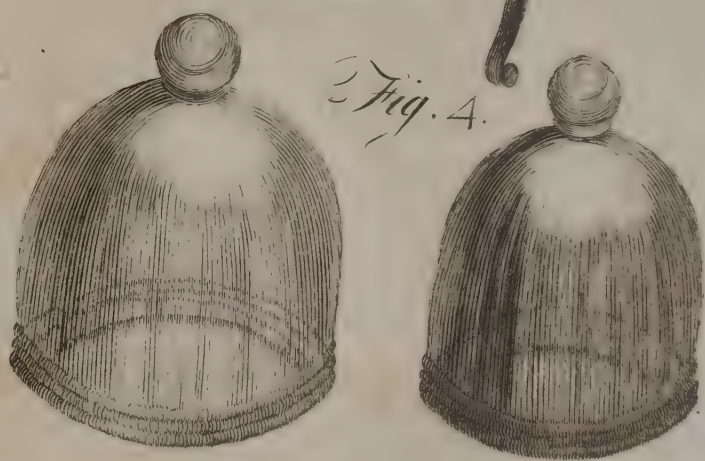


Fig. 6 & 7

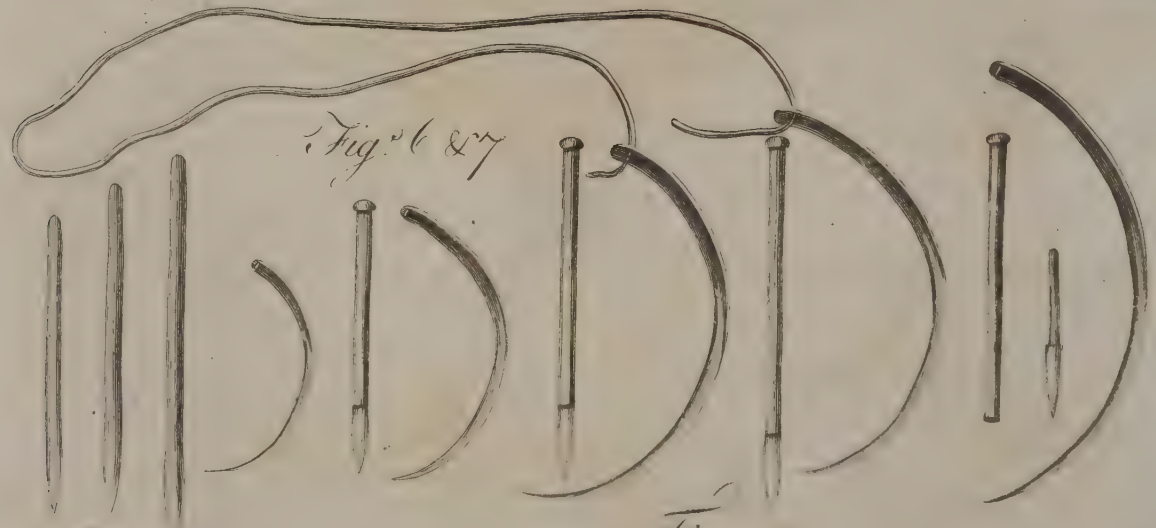
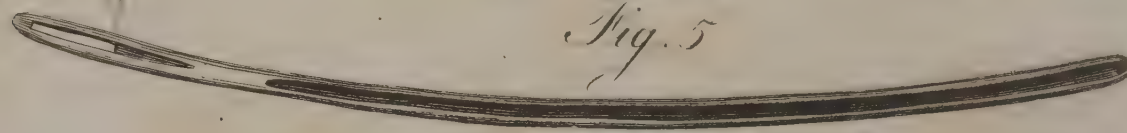


Fig. 5



gature a second time, the blood will frequently flow as freely as before, and while it flows the tumor will probably subside; or at least not arrive at such a size as to obstruct the efflux of blood. But sometimes it suddenly arises to such an height, as entirely to obstruct the operation, and prevent it from being finished. In this case, however, the most effectual method of preventing the tumor from being increased still farther is by removing the bandage. By continuing the bandage a very considerable swelling may be induced, and such as might be attended with great trouble. In this case, if more blood be required, we must take it from some other vein adjacent to that first opened, not from the former.

Tumors of this kind seldom require any application; but, when remedies are to be applied, astringents are much preferable to others; and brandy, or other kinds of ardent spirits, not inferior to any. It has likewise been found useful to apply compresses wetted in a weak solution of crude sal-ammoniac, kept on by a ligature very loosely tied. In some cases, however, though very rarely, such a quantity of blood is thus effused as cannot be taken up again; then the most proper method is to lay open the tumor, as soon as it is probable that no more blood will be absorbed.

Another,

Another, and much more dangerous accident, which sometimes occurs in blood-letting, is the puncture of a tendon or nerve. Such accidents happen entirely from mismanagement in the operator, and are occasioned immediately by depressing the point of the lancet, after it has been introduced into the cavity of the vein, and thus perforating both sides of the blood-vessel. The nerves, however, are not to be avoided so easily as the tendons are, as being small, and scarcely to be distinguished; nor are the symptoms occasioned by a wounded nerve at all more favourable than those which arise from a wounded tendon. It is indeed by no means improbable, that all the symptoms commonly supposed to arise from wounded tendons are really occasioned by wounded nerves. Even this, however, can scarce ever happen when the lancet is properly introduced; and in almost every case the blame may, without injustice, be laid upon the surgeon, though accidents in blood-letting have been known to happen in the hands of skilful operators.

The puncture of a nerve or tendon is known at the time of introducing the lancet, by an exquisite pain in the part, though sometimes this will go off by keeping the arm perfectly at rest, allowing a considerable quantity of blood to run off, and avoiding every thing which has a tendency

dency to heat the patient. In most cases, however, the pain, which is very severe at first, becomes much more so after the operation; the lips of the wound become sore and inflamed, a watery humour issues from the wound, and a swelling takes place in the parts adjacent. When these symptoms have continued for two or three days, the pain becomes almost intolerable, accompanied with a sensation of burning heat; the hardness of the lips of the wound increases, and the swelling extends itself over the whole limb, becoming at last exceedingly hard; an erysipelatous inflammatory colour frequently appearing all over it, with a quick hard pulse, restlessness, startings of the tendons, which, in many cases, have been followed by convulsions, locked jaw, and death.

Such a train of frightful symptoms do not always attend the puncture of a tendon. In the Medical Communications we have the history of a case, where a puncture of the tendon of the biceps seems fully to have been ascertained; yet the patient (a lady of about thirty-five years of age) felt not the least extraordinary pain at the introduction of the lancet. It was not till the evening of the next day that she complained of a tenderness in the wound. On the third day the whole lower arm was stiff, so that it was with difficulty it could be raised to her head. In the evening,

pains darted towards the extremities of the fingers, and a sensation was felt over the muscular part of the arm, as if bound with a cord. By an anodyne taken internally, the application of a mixture of oil of olives and laudanum, with an emollient cataplasm, the pain seemed to be relieved next morning, but increased again at night. By this time the wound itself was entirely closed and free from inflammation, but the pain near the place of incision was exceedingly acute; the arm likewise seemed to be a little swollen, and a slight degree of tension was perceived upon the anterior and muscular part of it. The sensation of being bound as with a cord continued; but no inflammation was perceptible upon any part of it; neither was the arm itself painful when moderately pressed. In this situation matters continued for fourteen days, when feverish symptoms came on, attended with acute pain in the arm, bilious vomitings, difficulty of making water, and a fixed pain below the sternum and about the lower jaw. Bleeding was now judged proper, but the patient refused to submit to the operation. The feet and legs were then bathed in warm water, and twenty drops of the tinctura thebaica ordered every two hours. After the third dose the patient became sleepy, and the medicine was discontinued. In the morning a violent swelling
came

came on, attended with an erysipelas, which spread all over the face, neck, and arms; and from that time all the dangerous symptoms abated. By a plentiful use of the bark the swelling gradually subsided; but it was not till after three months that the use of the arm was perfectly restored.

In this case, if any thing was of service, it plainly was the anodyne medicines. The bark and emollients have universally been found to do hurt; and, in the present instance, Goulard's aqua saturnina was also tried without effect. In such cases, Ambrose, Pare, Heister, &c. recommend the application of warm spirituous tinctures, as of myrrh, oil of turpentine, &c.; others cool astringent applications; but, in order to determine how far we are to expect success from any of these, it is absolutely necessary that we should determine the *cause* of the symptoms. If these proceed from a wounded tendon, there is little hopes of doing much by any external application; because the medicine, whatever it is, must spend its force upon the skin and cellular membrane, before it can get at the tendon. If they proceed from the puncture of a nerve, we can have still less hope; because we know not how far it is possible that a wounded nerve can reunite its substance after it has been wounded. In this case, the only remedy is to divide the
nerve

nerve entirely, by making a pretty deep incision in the flesh a little above the wound made in blood-letting. There have been instances where the most violent symptoms have been suddenly relieved, by an incision across the arm, and that not a very deep one. This shows evidently, that, in these cases, the malady has been occasioned by the partial division of a nerve. The difficulty of finding out the nerve so affected, however, renders this operation somewhat more difficult, and even dangerous, than it would otherwise be, and therefore the following directions for the performance of it will be necessary.

Having provided against any accident from the division of the artery, by applying the tourniquet, make an incision in the external integuments, so large, that you are sure the wounded nerve or tendon must be within it: Then gradually and cautiously make slight and shallow incisions in the cellular and muscular substance, until the wounded nerve is fairly cut through; taking all possible care to avoid the larger veins, arteries, and tendons. In this manner, we must proceed, if the patient is not relieved sooner, till we arrive at the periosteum itself. If the patient, even by this severe incision, finds no relief, the tendon next to the wounded vein must be divided also; but there is no instance on record where such a division has been necessary; and
this

this renders it probable, that the symptoms which have been enumerated proceed most frequently, if not always, from the wound of a nerve.

There is still another supposition, suggested by the late Mr J. Hunter of London, concerning the cause of these dreadful symptoms ; and that is, that they proceed from an inflammation of the internal coats of the vein. In what manner an inflammation of this kind should produce such a train of violent symptoms, we are not informed ; he rests his opinion on some anatomical dissections, chiefly of horses, which have died with symptoms of the above kind, in which the internal coats of the vein have been found inflamed, not only in the neighbourhood of the place where the vein had been cut by the lancet, but all the way from thence to the heart. Instances of this kind have likewise occurred in the human body ; a suppuration has ensued, and the cause of death, in our author's opinion, has been the pus carried along in the course of circulation to the heart. The frequent instances of relief, however, which have occurred from incisions near the wound in the vein, evidently show that inflammation of the vein was not, in these cases, the cause of the symptoms, because then they would not have been relieved by them. The case above quoted, from the Medi-
cal

cal Communications, seems more in favour of Mr Hunter's opinion than any other ; for, in general, where such accidents have happened, the patient has felt a very unusual degree of pain at the instant the vein was opened ; but, in the case under consideration, nothing unusual was felt till the evening of next day, when the inflammation might be supposed to have begun in the vein. The termination of the disease by erysipelas may also plausibly enough be supposed to be of the inflammation translated from the internal coat of the vein to the skin ; but still this inflammation of the vein might have been the *consequence* and not the *cause* of the disease ; though, indeed, it is difficult to see how any symptoms arising from the partial division of a nerve could suddenly cease, excepting by a rupture of that part of it which remained sound ; which, perhaps, might take place naturally. At any rate, as relief has been found so often from a division of the soft parts, no person can think it prudent to trust to remedies of a more uncertain and precarious nature. Opium seems to be the only one in which any confidence can reasonably be put ; but, where the symptoms increase, notwithstanding the free use of it, there is certainly the greatest reason for proceeding instantly to the operation. It must also be observed, that, in these cases, opiates are to be
given

given in much greater doses than ordinary, if we mean them to be of any service.

A third accident, which sometimes takes place in blood-letting, is the puncture of an artery. This is likewise extremely dangerous, being almost always accompanied with that species of swelling called *aneurism*; but this will be treated at large in a chapter by itself. Here it is proper to remark, that the puncture of an artery, as well as of a tendon, or nerve, rarely happens with a skilful operator; for, both being seated pretty deep, it is impossible to reach either without piercing both sides of the vein with the lancet, which no skilful person can be supposed to do.

CHAPTER II.

OF THE OPENING OF ABSCESESSES.

THIS, next to blood-letting, is perhaps the operation in surgery most commonly practised, and always takes place where a considerable quantity of matter is collected in any external part of the body. Of the formation of abscesses, we shall give an account when treating particularly of inflammation, of which they are very frequently the termination. They are known
to

to be fully formed, and in a proper state for being opened, by the cessation of the violent throbbing pain which takes place in the first stages of inflammation, and the coming on of a dull heavy pain, which continues constantly without any intermission. The swelling becomes more prominent, and draws to a point generally in the middle. This prominent part generally changes its colour to a yellowish white; and, if the abscess be not very deeply seated, the fluctuation of a fluid is very plainly perceptible. Sometimes, however, when the matter is collected below the muscles, the fluctuation can be scarce perceived, or but very indifferently, and the abscess is then much more diffused than in the former species. All large abscesses are likewise attended with shiverings, especially if seated in any of the viscera; and, even where the collection is not very considerable, the patient is liable to them in the first formation of the matter.

It is laid down as a general rule, in the treatment of abscesses, not to open them while any considerable degree of hardness remains, for this is a sign that the matter is not yet fully formed; though there are particular cases in which we must deviate from the rule, particularly in those which are seated in the thorax, or abdomen. For, when large collections of matter are formed upon these parts, they are as ready

to

to burst internally, as externally, and the consequence of that would be certain death, or at least extreme danger to the patient. Where such abscesses occur, therefore, the surgeon ought to open them, as soon as any fluctuation, however small, can be perceived. It is true, that abscesses, when opened at such an early period, do not heal so easily as if the operation were deferred till they came to perfect maturity; but here the danger outweighs every other consideration. The same method ought to be followed in those abscesses which happen in the plague, or in malignant fevers, because in these the pus which is formed differs much from that of a common abscess, and, by reason of its virulent nature, would augment the disease, if it were allowed to stay till it came to perfect maturity. Even the matter of a common abscess, though naturally mild, yet if confined too long in the cyst, will turn very acrid, and by being absorbed into the blood, will produce an hectic fever, from which the patient can scarcely get free, even by opening the tumor, after it has come on, so that the exact time of maturity should carefully be watched, and the matter let out as soon as it is perfectly formed.

After the abscess is fully ripe, the next question is, by what means the opening is to be made? There are three methods at present in

use, by which vent may be given to the matter; viz. by the application of caustic,—by an incision with a knife,—or introduction of seton. The first is more agreeable to timid patients, who dread the pain of incision, but is attended with some inconveniences, which render the method of incision much preferable. One of these is, that the caustic acts slowly, and produces a long continued pain; while the pain of incision, though much more sharp for a moment, yet instantly goes off. Another inconvenience, of still more importance, is, that no kind of caustic has yet been invented, the effects of which can be confined to a certain determinate extent, either as to length or breadth. Hence we are apt to give the patient much more pain than is necessary; and, if the caustic acts upon nervous and very sensible parts, it will occasion much more pain than the knife could have done.

The method of opening abscesses by the knife, is to make an incision of such a size as may give sufficient vent to the matter, of which the operator must judge from the nature and size of the collection. This opening is to be made in the most depending part of the tumor, that the matter may run out the more freely. It is a practice to make the incision through the whole length of the tumor; and some have even directed the cutting out a considerable portion of
of

of the skin, in order to give more free vent to the matter; but it is certainly wrong thus to destroy a quantity of skin, which might otherwise have contracted itself, and returned to its former dimensions. It is true, that in all abscesses there is much of the skin, which, by its discoloration, and flabby appearance, seems to have totally lost its power of contraction; but of this last we can by no means be judges; for it is impossible for us to know how long this contractile power will continue, and it will even return after being for a time entirely lost.

Another and still more important consideration, in the opening of abscesses, is the admission of air into the cavity, which is unavoidable in case of a large incision. This is immediately attended with symptoms of putridity; the pus, which at first was white, thick, and free from any foetor, becomes instantly thin, foetid, and corrosive; a quick pulse, and hectic sweats come on, from which the patient scarcely recovers, if the collection of matter has been very large.

These are sufficient objections against large incisions, whence there has been a third method proposed, which seems preferable to either caustic or incision, viz. the draining off the matter by means of a seton. This has the advantage of being attended with little pain, emptying the abscess in a very gradual manner, and very effectually

fectually preventing the access of air, which in the other methods is so much to be dreaded; and a cure is generally performed in half the time that would otherwise have been requisite, and that even under the most favourable circumstances.

The method of performing this operation, is by means of the instrument represented Plate I. Fig. 5. The director there represented, being threaded with glovers soft silk, is to be introduced into the upper part of the tumor, through an opening made with a lancet; the thickness of the thread being always proportioned to the size of the tumor. It is then to be pushed down to the most depending part, till its point can be felt on the outside of the skin; an incision is to be made upon it somewhat larger than the upper one, and the director with part of the cord drawn through the wound, after which the director is to be withdrawn. The reason of making the under incision larger than the upper one is, that the matter may thus all flow out through the under orifice, and none through the upper. Two or three inches of the cord should be left hanging out at the lower orifice; and, to cause it run easily, it ought to be well rubbed over with any kind of emollient ointment. In about thirty-six hours after the cord has been introduced, it may be drawn out as far as to allow all the part that was within the cavity to be cut off; and the
same

same is to be done every day, until the matter be completely evacuated. Thus a regular and flow discharge of the matter is procured, the sides of the abscess gradually contract, and at last adhere firmly to one another, by reason of the slight inflammation kept up on them by the friction of the cord. As the discharge lessens, the cord ought also to be diminished in size; and, when the former becomes very small, the cord may be taken away altogether; after which, the sinus will soon be thoroughly healed, by compressing it with a roller and small compress made of linen, applied in the direction of the cord. The same method has been found to answer very well, in all tumors of the melicerous kind, where the matter is not very thick, as well as in tumors of the scrophulous kind; but, when the cord is apt to press upon any very sensible nervous part, the excessive pain and irritation it occasions renders the use of the lancet or knife preferable.

In June 1788 I was called to a patient I. in the country, J. G. aged twenty. He complained of severe pain along the whole anterior part of the right thigh. On examination a remarkable enlargement was observed, and a fluctuation of matter felt, from the trochanter major to the external condyle of the femur, and

and from the groin to the top of the internal condyle, running, on the under part, in a straight line from the one condyle to the other. Through the whole anterior part of the thigh, indeed, the fluctuation was very distinct. On inquiry, I found that, about three months before, after having been fatigued with walking, he felt a pain in the superior and anterior part of the thigh, attended with a small degree of tumefaction. Along with the pain this tumor gradually increased, so that in eight days it spread from the trochanter to the right groin, and descended on the anterior part of the thigh about six inches. On the application of a poultice it became soft; the pain on the superior part was entirely removed, but the lower part remained inflamed and painful, the tumor spreading downwards anteriorly and on both sides, until, by degrees, it occupied the space above mentioned.

I found him much emaciated; his appetite gone; pulse an hundred and twenty; no regular discharge by stool, except by injection, for many weeks past; and for nine weeks, that is from the first appearance of softness in the tumor, he had been constantly confined to his bed. At the time I saw him he could not move in any manner, on account of his extreme debility, and the pain attending every effort to change his posture.

In this situation, the only means to save the patient being evidently to evacuate the matter in as gentle a manner as possible, I introduced a seton, reaching from near the trochanter obliquely across the thigh, to the most depending part, which was immediately on the superior part of the internal condyle. The inferior opening was made about an inch and an half in length, in order to give sufficient vent to the very great collection of matter. The seton was dressed in the ordinary manner; a flannel roller, four inches broad, pinned round the waist, and rolled in a spiral direction round the thigh, in such a manner as gently to compress the whole tumor from the upper to the under part, and then to promote the evacuation of the matter from the inferior orifice, as well as the adhesion of those parts from which it was evacuated. By reason of the great discharge of matter, it was found necessary to draw the cord every twenty-four hours. In no longer space than three days his pulse decreased from 120 to 108; he slept four hours without any anodyne; whereas, before the introduction of the seton, he had seldom slept any without their assistance. In eleven days from the operation he seemed to be perfectly well; all the functions being regularly performed as in health; only the debility from what he had formerly suffered, and the discharge
from

from the seton, still remained. Both of these, however, daily decreased; so that in six weeks from the first introduction of the cord it was withdrawn; and in a week afterwards the sinus was completely healed up in the way above mentioned, by the small compress and roller.

The same year I was called to R. C. aged II. twenty-four, who complained of an acute pain in his back, occupying the space of the quadratus lumborum, accompanied with a very considerable degree of tumefaction, along with an evident fluctuation of matter. On account of the thickness of the integuments, it was judged proper to apply an emollient poultice for a day or two, after which the swelling was observed gradually to descend, so as to cover the whole of the upper part of the glutæus maximus, in a line with the trochanter major. The tumor was now found to increase upon coughing or sneezing, the pain being at the same time remarkably augmented, matter being likewise voided by stool, along with the fæces. In this situation I introduced a seton, from the innermost false rib to about the middle of the glutæus maximus, being the most depending point of the tumor; the lower orifice here being at first about an inch in length; but, on finding that a considerable quantity of fæculent matter

matter was discharged along with the pus, it was judged necessary to enlarge it to two inches. The seton was dressed regularly every twenty-four hours; and to check the diarrhœa which the patient had for some time laboured under, I exhibited a mixture of electuarius catechu, with tinctura thebaica, a table spoonful given after each loose stool; by which means, in the course of ten days from the first introduction of the seton, the diarrhœa almost entirely ceased, as well as the fæculent discharge by the external orifice. A scruple of bark was now ordered thrice a day, washed down with a glass of water, containing thirty drops of elixir of vitriol; exhibiting every night an anodyne composed of thirty drops of laudanum, with a scruple of electuarius catechu dissolved in cinnamon water; and along with these medicines, a generous diet was allowed. By continuing this course, in three months from the operation, the discharge entirely ceased, and the seton being withdrawn, the parts healed up kindly, and the patient recovered his former health.

A. M. aged fourteen, was brought to me in the month of March 1783, with a large III. oval tumor occupying that part of the back covered by the fleshy portion of the latissimus dorsi on the left side, six inches in length, and about

five in breadth. In this swelling a fluctuation of matter was very distinctly perceptible ; though it had originated, and even increased to its present bulk, with little or no pain ; the only complaint she had being a slight cough, with a little uneasiness in breathing at nights. Pulse, appetite, and belly natural. A puncture was made with an abscess lancet in the upper part of the tumor, after which a directory, loaded with thread anointed with basilicon as directed, was introduced, till the grooved point reached the most depending part. An incision of about an inch in length was made upon it with a round edged scalpel into the groove ; the directory being then pushed through the wound, and the thread by its means drawn out at the lower part of the tumor. It was dressed with a slip of cloth about two inches long, and an inch and half broad, spread with basilicon*. The slip was cut down the middle, about an inch lengthwise, and then laid on in such a manner as completely to surround the cord ; and this dressing was applied both to the upper and under orifice. A piece of linen four times folded, and of a size sufficient to cover the whole tumor, was laid over the dressing ; and the extreme part of the
cord

* In this way it is understood that all fetons of this or any other description are to be dressed.

cord, which had been drawn through the wound, and which was about two inches and an half in length, was wrapped three or four times about with a bit of linen, and turned up on the comprefs. The upper end of the cord was neatly folded into feveral folds and turned down ; after which a flannel roller was wrapped three or four times round the body, not tighter than to allow free motion to the ribs. To prevent the roller from falling down, a piece of linen, about fix inches broad, was pinned to the roller on the back, brought up to the neck, and cut in the middle, one half paffed on the one fide, and the other on the oppofite, then croffed over upon the breaft, and the extremities pinned to the roller on different fides.

The difcharge was copious for eight days, after which it daily decreafed, but in five weeks from the operation, it was fo much diminifhed, that the few remaining threads of the cord were entirely withdrawn, after which the finus being drefsed as directed, healed up completely in lefs than a week ; and from that time to the prefent the patient has enjoyed perfect health.

E. H. a child of five years of age, was
attacked in the month of December 1791 IV.
with a fevere cold. On my being called, I found
her labouring under a conftant teasing cough,
pain

pain in her left side, particularly severe about the middle, betwixt the last true and first false rib; headach with constant restlessness, and dyspnæa, pulse small and hard, 120; tongue dry and brown; skin hot and dry; belly costive. At this time she had been eight days ill. Six leeches were applied to the pained side, which bled rather copiously; had a mixture with a spoonful of spiritus mindereri, two of mucilage cinnamon water, and common water, of each two ounces, with a dram of emetic wine; a table spoonful to be swallowed every second hour. At night she had a laxative injection made with ℥x of the decoction of chamomæl, ℥iij sea salt, and ℥i of oil. Next day the symptoms were considerably relieved, medicines continued, except the leeches. In four days after I first visited her, the pain of her side began rather to increase, the cough too became more troublesome; the pulse small and weak, with frequent rigors, succeeded by slight hot fits, attended with a little sweat. A blister was this night applied to her side, and a tea-spoonful of an electuary, made with cream of tartar and syrup, given every two hours until it operated. Next day the symptoms were but little abated; the pain of the side and uneasiness still continued, and the cough still more troublesome, if possible, than before; for which reason
an

an opiate was given at bed-time. During the night-time she slept a little, and next day seemed less uneasy, though the rigors still continued. In ten days, however, from the first time I saw her, although during that time she had been twice blistered, the pain of her side still continued, with a considerable degree of oppression in breathing. In this situation she was once in danger of suffocation in a fit of coughing, but was happily relieved by discharging a considerable quantity of purulent matter by the mouth. This discharge continued for some time to attend every fit of coughing, but was observed every day to decrease, and her appetite and strength rather mended. But as the pain of her side still remained troublesome, the blister was again put on for the fourth time. In six weeks from the time I saw her, the only symptoms which remained were a slight pain of the side and cough. Upon calling in a few days after, I was told by her mother that she had a swelling on her side immediately on the part where the pain was seated. On examination, I found a soft swelling, about the size of a goose's egg, evidently containing a fluid. Upon coughing, an undulation was also perceptible; on which it instantly struck me, that, as the tumor seemed to communicate with the lungs, I might, by introducing

ducing a small seton from the upper to the most depending part of the tumor, discharge its contents, and prevent the free admission of air into the lungs, the skin acting as a valve immediately above the opening, which appeared to me to be in the centre of the tumor. This was immediately done; and a quantity of matter, not less than twelve ounces, was discharged, with considerable force, from both orifices. The skin collapsed; and, on every inspiration, it appeared evident, from the noise of the air rushing in at both orifices, that the cavity of the tumor communicated with the lungs. It was immediately dressed; and an emollient poultice, contained in a bag for the purpose, applied over the dressings, in order the more effectually to keep out the external air. The seton was dressed regularly every twenty-four hours; the cough and pain of her side, of which she formerly complained, daily decreased; and in eight weeks from the first introduction of the cord it was withdrawn; the opening in the side, which communicated with the lungs, having been closed up a week before; and, in a few days afterwards, the whole was completely cured, and the patient restored to perfect health, which she still continues to enjoy.

In February 1791, I was called to C. H. V.
aged twenty-seven. He had a fistulous fore

on

on the back of at least six inches in length ; the uppermost opening of which had originally been the under opening of a former abscess, and was situated near the spine on the under edge of the lowermost false rib ; the fistula running from thence down to the anterior spine of the os ilium, where there was a very great collection of matter. The upper orifice had been made by an eminent practitioner, about a year or upwards preceding the time that I saw him, at the most depending part of a very considerable abscess, which I was at the same time told discharged its contents almost entirely. This opening, which originally was at least three inches in length, seemed to have begun to heal up rather from the bottom, where I understood that a slight hardness still remained ; and, at the same time, a very considerable discharge of matter from those parts of the former abscess where the skin seemed evidently not to adhere. In this situation the patient's health was considerably impaired, apparently by the absorption of the matter, and by its penetrating downwards to the extent already mentioned. It therefore appeared to me, that the only probable means of attempting a cure, was, by the introduction of a seton in the way already directed, from the upper orifice downward to the most depending part, and endeavouring

vouring to unite all the parts above the opening by compresses and roller.

At the time I saw him, and for many months before, he was so much exhausted from the discharge, that it was with the utmost difficulty he could get out of bed and walk through his room, his general health being destroyed by the discharge and absorption. He readily agreed to the introduction of the seton; which was done in a day or two from the time I first saw him. On account of a distressing diarrhœa which he laboured under, I exhibited an eight ounce mixture, with two drachms of the electu-
arium catechu, and eighty drops of the tinctura thebaica, with cinnamon and plain water, and a little syrup to make it palatable. A table-spoonful of this was given him after each loose stool. By degrees his diarrhœa abated; his natural rest returned; and his appetite began to mend. The seton continued still to discharge freely; the upper parts began to adhere; the matter, which was formerly thin and of a milky appearance, began to be thick, and of a proper consistence, with a degree of yellowness. His health from this time gradually mended; and at this moment, altho' nearly twenty months since the seton was introduced, it has not been altogether removed, yet he has recovered, in the most perfect manner, all the functions of his body, which are per-
formed

formed equally well as before he was affected with this disease. The reason of not removing the seton entirely must be obvious; viz. that having been so long accustomed to such a vast discharge of matter, it might have proved dangerous to check it at once; for which reason, it was necessary to diminish it by slow and imperceptible degrees.

On these cases it is likewise obvious to remark, that in none of them was the health of the patient in the least affected by the introduction of the seton, which is undoubtedly sufficient to give it a decided preference to the use of the scalpel or abscess-lancet in all large abscesses; for, in every abscess of five inches in length that ever I saw, which was opened for half its extent, the health of the patient suffered very severely.

Though I have already disapproved of the use of caustic in the opening of abscesses, yet, as sometimes cases may occur where the patient will not submit to any other method, or it may be chosen for some particular reason, I shall here describe the manner of using it. The caustics usually employed, are either that called *lapis infernalis*, made by evaporating soap-lee to dryness, and then fusing the salt; or the *lunar* caustic, formed by evaporating solution of silver in aquafortis. The abscess is then to have a

flip of adhesive plaster applied to it, with an oblong slit cut in it, of a size somewhat less than you intend the opening to be; and this slit must be filled with caustic, either whole or in powder; but the latter seems preferable; and, if the caustic is wetted, it will perform its office the sooner, so as sometimes to make an eschar in an hour or two. The length of time required for this purpose, however, will be various, according to the thickness of the skin, and the strength of the caustic; and thus it may sometimes be five or six hours before an opening be made large enough for the matter to get out. When we find that an eschar is made, it must be softened with fresh butter, digestive or basilicon ointment, until it becomes loose and easily separable; after which the matter is to be discharged, and the abscess treated as one opened by incision. When the caustic is first applied, it must be covered over with a plaster, and the whole secured with a large compress and bandage. These precautions are necessary to keep the caustic from spreading, and, after all, are frequently insufficient for the purpose; but the lapis infernalis, by reason of its great attraction for humidity, is much more apt to spread than the lunar caustic.

CHAP. III.

OF SUTURES.

THESE are calculated to prevent the wide gaping of the lips of wounds from each other, by which such a large surface would be exposed to the air, that not only a prodigious quantity of matter would be discharged, to the great danger of the patient, as in the case of abscesses, but after the wound was healed, a great loss of substance would appear to have taken place, which deformity might have been in a great measure avoided by the timely use of a future.

The future of divided parts of the human body is performed by means of the instruments with which any other thing is sewed, viz. needles and thread; but here the thread must be very strong, and the needles crooked, that the latter may get down to the bottom of the wound, and that the parts may be held together with sufficient force. The future is made, by having each end of the thread put through the eye of a needle; then putting down each of the needles to the bottom of the wound, run it through the flesh and skin from the bottom upwards and outwards, making the points come out through the skin at a considerable distance from the lips of the wound, that
there

there may be no danger of the flesh giving way. The thread is then to be tied, passing the end twice through the ring, and pressing the sides of the wound together, till they meet at the place where the stitch is, and then secure it by a second knot, tying both directly over the lips of the wound. The number of stitches or ligatures of this kind is variable, according to the extent of the wound. The general rule is, that one future is sufficient for every inch of wound ; but, that in some cases a greater number is requisite, particularly where the wound gapes very much in consequence of the division of muscles. When the wound has angles in it also, the number of futures must be augmented ; for every angle, though ever so little, must have a future for itself.

It is necessary to pierce the skin at a sufficient distance from the sides of the wound, lest the thread should cut through the flesh in a short time, and reduce the wound to its primitive state ; but there is not yet any certain rule laid down as to the exact distance requisite to be observed in this respect. The general rule, (that the needle ought to pass through the skin at a distance from the wound, nearly equal to its depth,) can apply only to such wounds as are shallow ; for, when very deep, it would be absurd, nay perhaps attended with very dangerous

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ous consequences, to put the needle through such a thickness of flesh, and in very shallow wounds; but such as are of considerable length, perhaps the depth of the wound may be too little for a measure of the distance from its sides at which we are to perforate the skin. Half an inch in most cases will be sufficient; and in none perhaps will it be necessary to perforate at more than an inch distance from the lips of the wound. Some have directed a single knot, with the ends put twice through the ring, as sufficient for securing the lips of a wound; but this seems doubtful; and, considering the very little trouble there is in tying a knot, it can never be eligible to run any risk to avoid doing this. It has by some been recommended to insert a little lint between the skin and first knot, or between the first and second knot; but neither of these can answer any good purpose. The proper form of the needles is shown Plate I, Fig. 6. they ought to be flat instead of round; as in this last case there would be more danger of the ligature making its way through the flesh. To facilitate its passage, the thread ought to be flat, not broader than the needle, and rubbed over with bees wax.

A number of different kinds of futures have been recommended by writers on surgery; but all of them are now reduced to two; at least, according to the practice of the most celebrated surgeons,

surgeons ; viz. the *interrupted* and the *twisted* future.

The *interrupted* future takes place in large wounds where a number of stitches is required ; and the interruption is only the distance between these stitches. This interruption must be determined by the judgment of the surgeon himself ; but, as has already been observed, one inch of wound is generally sufficient for a future ; though this must be determined by circumstances sufficiently obvious, from the nature and situation of the wound. In this future the ligatures are all to be passed, before any one of them is tied ; after which they are to be tied, as already directed.

The *twisted* future is most generally employed for the purpose of uniting parts separated, either naturally or artificially, to a considerable distance. It is particularly employed in the hair-lip ; though it may likewise be employed in any artificial division of the lips, cheek, or face ; and it is likewise useful in all wounds of the cranium where futures are necessary, or any shallow wound wherever situated. In deep wounds it is not admissible, because there the pins necessary in this kind of future cannot be introduced to a sufficient depth, and afterwards twisted with ligatures in such a manner, as would reunite the
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the divided parts, without great pain to the patient.

The twisted future is made in the following manner. Having brought the divided parts nearly into contact, so that the operator may just see that the pins are introduced at the proper depth; the pins must be introduced from the outside inwards, not from the inside outwards, as was directed in the other future. They must then be pushed forwards and inwards, to within a little of the bottom of the wound; afterwards carrying them outwardly through the opposite side, to the same distance from the edge that it entered at on the former side. This distance must be determined by the depth of the wound, and the retraction of the divided parts; but, in general, it is proper to carry the pins nearly to the same distance from the edge that they penetrate in depth. Whatever deepness the wound is, we may also remark, that the pins must pass nearly to the bottom of it, or the deepest parts will be in danger of not being united; whence the matter generated by the suppuration of the wounded parts would naturally produce collections, sometimes troublesome in their consequences. For passing the pins with the greater ease, it is proper that they should be made as represented Plate 1. Fig. 7.

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The pins being past, as just now directed, a firm waxed ligature is to be passed around them, making the figure of 8, by which the wounded parts are drawn gently into contact; and this operation is to be repeated according to the size of the wound. But, whenever this future is made use of, a pin ought to be introduced at each extremity, or very near it, to prevent a disagreeable separation of the lips of the wound there, which could not afterwards be got the better of. Half an inch, or at most three quarters, is the proper distance betwixt two pins in this future.

After the pins are all fixed, the only dressing necessary to be employed is some lint wetted with oil, laid all over the wound, in order to exclude the external air. A small bolster of linen, or other soft matter, is by many writers on this subject directed to be placed under the pins; but, though this may give ease to the parts immediately subjected to the pressure of the pins, it must of necessity occasion great pain, by the same pressure being transferred to those parts through which the pins pass, and which may easily be perforated by a continuance of that pressure. Pieces of linen spread with Turner's cerate will answer all the purposes that can be expected from bolsters, without any of their inconveniences.

For

For the same reason that bolsters are to be avoided in this kind of future, we must avoid putting any bandage over the pins ; because this would make an additional pressure upon them, and thus increase the pain which the patient must at any rate sustain. There is a common error into which young surgeons fall when making this future, viz. that of drawing the ligature too tight ; by which the patient not only is subjected to great pain, but the pins are in a very short time forced out through the flesh, and the wound flies open. This ought, therefore, to be carefully avoided, and the ligature drawn no tighter than is barely sufficient to keep the sides of the wounded parts gently together.

The time during which the pins must remain in the flesh is to be determined by the depth of the wound, the habit of the patient's body, and other circumstances, of which the surgeon must judge at the time. Indeed, every day's experience shows us, that if the pins are not removed within the time below specified, they always cut their way through the integuments, leaving a ragged irregular wound, which, in the hare-lip, is always disagreeable, even when healed up, to look at. Two, three, or four days, are sufficient to promote an adhesion ; but if the health of the patient be affected, it is impossible to lay down any general rule. When the pins are with-

drawn, the newly united parts may be kept from separating by slips of cloth spread with adhesive plaster, and applied to the sides of the cicatrix, and pressed together by proper ligatures.

Besides these futures properly so called, surgeons have been accustomed to use what is called the dry future in all cases of long and superficial wounds, where the sides can be easily drawn together, and retained in their position by a small force. In this the flesh is not penetrated by pins, the whole being done by long slips of cloth spread with adhesive plaster; these are to be folded so that one half may be put upon the skin on one side of the wound, and the other upon the opposite side. Having then fastened the one half upon one side of the wound, press the sides of it together, and turn over the other half of the slip upon the skin on the other side, drawing it tight, and holding it there till the warmth of the part makes it adhere; after which the cohesive nature of the plaster will keep the lips of that part of the wound together. Another slip is to be applied in the same manner, at a little distance, and so on, according to the extent of the wound. This future will be better understood from Plate 2. Fig. 1. It is extremely useful in wounds of the face

face and cheek, where it is greatly preferable to the others.

Another method of making the dry future, is by means of two flips of plaster running along the sides of the wound, at some small distance from the lips, each of the plasters being furnished with strong threads or strings, one for each inch of wound, by tying of which the lips of the wound will be drawn into contact, and retained with more or less force, as the strings are tightened or slackened. See Plate II. Fig. 4.

CHAPTER IV.

OF THE LIGATURE OF ARTERIES.

THIS operation takes place in all cases where any of the large arteries are wounded, or diseased in such a manner, that they cannot properly perform their functions, as in the case of aneurisms. When a large artery is wounded, we must, in the first place, restrain the hæmorrhage, which threatens to destroy the patient. This may be accomplished in the most effectual manner, by compressing the artery above the wounded place so strongly as to intercept the flux of blood through it; or, where that cannot be done, dossils of soft linen, lint, charpee,

charpee, or thin pieces of agaric, are to be pressed firmly against the bleeding mouths of the vessels, either by an assistant, or by a proper bandage; the former method, however, as admitting the ligature to be more easily applied, ought always to be preferred where practicable. The instrument by which this compression is made, is called a tourniquet, an invention of the last century; and, when any operation of consequence is to be performed upon the extremities, is found to be of the utmost utility, and to render those operations perfectly safe, which otherwise could not have been performed without the utmost hazard.

The tourniquets first in use were no other than pieces of ropes passed twice round the limb, with a thick compress or cushion put upon the principal artery, after which, a small bit of stick, introduced between one of the folds of the rope, was twisted round till the rope became sufficiently tight to put a stop to the circulation of the blood through the artery. This tourniquet continued to be made use of till M. Petit contrived an instrument, which, by means of a screw, compressed the principal artery, without injuring the limb, by such a violent pressure as it necessarily sustained from the twisting of the cord above mentioned, and could be managed by the patient himself, without the assistance of

a surgeon. It was, however, subject to one very great inconvenience, viz. that the pressure being thus made only upon the principal artery, the circulation went on without interruption in the smaller branches; and, as many of these communicate with the large artery, though the great flux through the principal trunk was thus restrained, yet a considerable quantity of blood was still discharged from the smaller vessels which emptied themselves into it, either betwixt the wound and the tourniquet, or below the wound altogether. This inconvenience is effectually remedied by the instrument represented Plate II. Fig. 3. where A represents the body of the tourniquet, B the handle of the screw, and C the strap to be put round the limb, to be firmly fastened by the buckle D, which last is to be connected with the strap in the most secure manner possible, that the force of the screw may not be in danger of pulling them asunder.

When this tourniquet is to be made use of, we must provide a linen cushion about three inches long, and one inch and half in breadth. This cushion must not be made by rolling up the cloth, lest its round figure should make it slip off the artery. It must be formed by folding the cloth till it becomes from three quarters to an inch in thickness, or more. Indeed, the size of it must be in proportion to the artery that is
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to be compressed; but never exceeding one inch and half in thickness. It is then to be put upon the large artery, and kept on it by means of a slip of cloth of the same breadth sewed to it, and put once or twice round the limb. The tourniquet is now to be applied, the strap C being put around the limb, and the end of it put through the buckle D; the handle of the screw being placed opposite to the cushion upon the artery. The strap is to be pulled through the buckle, as far as would be necessary to make an equable pressure all round, were the cushion away; and when this is done, it is obvious, that while the cushion compresses the large trunk of the artery, the other parts of the strap effectually stop the circulation through all the lesser branches; and so well adapted is this instrument to the purposes for which it is designed, that when proper attention has been paid to the circumstances already mentioned, half a turn of the screw will be sufficient to put a stop to the circulation entirely. This, however, depends on the tightness with which the strap is drawn through the buckle at first, for if this be but slackly done, two or three turns will be necessary for the purpose.

The hæmorrhage being stopped by means of the tourniquet, or otherwise, the next thing to be done is to apply the ligature to the artery.

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But here a considerable correction in the ordinary practice is requisite. It has been recommended by most authors, in cases of amputation, where the ligature of arteries is peculiarly necessary, to pass a crooked needle threaded round the mouth of the vessel, at about a quarter of an inch distance from it, and including in the ligature a considerable part of the muscular flesh, together with the nerve which accompanies the artery; and then securing the whole by a double knot. This method, however, by reason of the pressure it occasions on the nerve, is frequently productive of the most violent pain, convulsions, and even death itself. Neither is it possible to avoid this inconvenience, while the needle is made use of. It is true, the disagreeable consequences we mention do not occur in every amputation; but this is by no means a proof that they are not sometimes occasioned by the above mentioned mode of operation. On the contrary, we are certain that they have frequently occurred, and been afterwards removed, by freeing the nerve from the compression of the ligature, and tying up the arteries by themselves, in the manner we are now about to relate.

It was long ago proposed by the celebrated Ambrose Pare to tie up the arteries by themselves, without including the nerve. His method

thod was to draw out the artery by means of a pair of forceps, which being held by an assistant, the surgeon easily passed the ligature round it, and secured it by a proper knot. To this practice it was objected, that the ligature made upon the artery by itself was apt to slip off, or to wear through its coats, and thus produce a fatal hæmorrhage; and, in order to obviate this supposed objection, the practice of taking up the arteries with a crooked needle was introduced. This objection, however, seems not to be well founded, for the coats of the arteries are very strong, although at the same time it requires no great force to compress their sides into close contact with each other; neither is it at all difficult, even in the largest arteries of the arm and thigh, to secure the ligature on the place where it was first tied. Hæmorrhages, indeed, have been known to happen when this method of tying up the arteries by themselves has been practised; but they have happened also where the crooked needle was used. Neither can it be determined, whether these hæmorrhagès were occasioned by the slipping of the ligature, or by the bursting forth of blood from some vessels unnoticed during the time of operation; and it is the opinion of some eminent practitioners, that they happen much more frequently when the needle is used than the ligature.

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The method at present most frequently used, of avoiding all the inconveniencies above mentioned, is, by making use of the instrument called the *tenaculum*, represented Plate II. Fig. 4. A ligature for the artery is first to be formed of two, three, four, or five white sewing threads, laid side by side, and waxed, not twisted, that they may not be in danger of cutting the vessel; make a ring upon this ligature, through which you must put one of the ends twice, that when drawn tight, it may form what is called the surgeons knot. Put this ring over the curved part of the *tenaculum*, and, introducing the sharp point of that instrument into the under part of the artery, at about the eighth of an inch from its divided extremity, carry it through the opposite coat at about the same distance, letting the point penetrate a very small way beyond the coat. Draw out the artery as far as is necessary for making a secure ligature; then let an assistant bring forward the ring which hangs upon the *tenaculum*, over its point, and draw the two ends gently, till the sides of the vessel are close compressed together; and, having secured this knot by tying another upon it, the operator withdraws the *tenaculum*, and cuts off the ends of the ligature at such a length that they may hang an inch without the edge of the wound, or more. If the artery be large, four or five

threads will be necessary, as when a thigh or arm is cut off; but, in proportion to the size of the vessel, the number of threads must be increased or diminished. Five are sufficient for the largest, and two are necessary for the smallest artery, which can require this operation.

The method of using the needle, in cases where the tenaculum or forceps cannot be applied, is as follows. Having put several threads waxed through the eye of it, turn the concave side of it towards the artery to be stitched; then enter the point into the flesh, at about a quarter of an inch distance from the lower part, or one side of the artery, pushing it out at an equal distance from the upper part or opposite side. Carry it then laterally at about the same distance from the artery, and pushing it downward through the flesh in the same manner as before, and then the two ends of the ligature will hang down, as represented Plate II. Fig. 5. by the tying of which in a proper manner it is easy to see that the orifice of the vessel must be completely closed, and all hæmorrhage prevented.

In cases where a wounded artery lies deep in the flesh, so that the ligature cannot properly be applied by means of the tenaculum, it must be done by the needle, passing it under the vessel, without wounding its coats; bringing it up on
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the other side, with part of the thread, and tying it firmly on the upper part, with the surgeon's knot so as to press the sides of the artery into contact; which may be done without injuring the nerve, or any of the muscular parts.

CHAP. V.

OF ANEURISMS.

By this term is meant, the tumor occasioned by the dilatation or wounding of an artery, and the collection or effusion of blood consequent thereupon. It is of three kinds; 1st, When the coats of the vessel are dilated and enlarged into a sack continually increasing in bulk, which is called the true aneurism; 2d, The false aneurism, when the coats of the vessel are either entirely ruptured, and the blood flows out under the aponeurosis of the biceps, and into the surrounding cellular substance, and forming a tumor resembling the former in external appearance, but of a very different nature; or when the external coat of the artery is only cut through, in which case the interior ones are dilated into the form of a sack. When the artery below a vein happens to be wounded through
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all its coats, as in blood-letting, in which case a communication is made between the cavities of the artery and vein; in this case also a tumor is formed, gradually increasing in bulk, but different in its nature from either of the two former. This is called a *varicose aneurism*.

Though all these aneurisms have somewhat of the same appearance at first view; yet, on a careful examination, they may be easily and exactly distinguished from one another, even externally. The true aneurism at the beginning is very small, and the skin retains its usual appearance, a pulsation being felt in it exactly corresponding with that of the artery; by pressing pretty strongly upon it, the blood is entirely forced out of the sac, and the tumor totally disappears, but instantly returns upon removing the pressure. By degrees the swelling increases, becomes more pointed, the skin loses its colour, some parts become hard, and the tumor cannot be made to disappear by pressure as formerly. At last it becomes very painful, the skin becomes lived, and has a gangrenous appearance, and sometimes a real mortification takes place; but when this is not the case, the skin cracks, a bloody matter issues forth, considerable hæmorrhages happen now and then, till at last when a great part of the skin becomes unable to resist the impulse of the blood, the latter bursts forth

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at once in an impetuous torrent, and the patient suddenly expires, if the aneurism be seated upon any of the large arteries of the body; but, in the extremities, death may be prevented, by compressing the sound part of the artery with a tourniquet.

The false or spurious aneurism is, from the beginning, larger and less compressible than the true one. It yields indeed a little to the fingers; but, as it is not contained in any arterial sac, the blood cannot return into the artery, as in the former. The hardness which, in both cases, is owing to a coagulation of the blood, comes on much sooner than in the true aneurism; because in this there is no kind of circulation through the tumor, but the blood is effused into the contiguous parts. According to the resistance which these parts are able to give, it is easy to see that the tumor will be more or less circumscribed; and hence it will sometimes suddenly enlarge greatly in size, and at other times will remain stationary for several weeks, nay, even for months and years. By compressing the artery strongly, in order to stop the efflux of the blood, it frequently happens that the swelling greatly increases; because, while the compression is made upon the artery, it also happens that the veins are compressed, and, by the resistance made to the circulation, the wound in the artery

is dilated, and the blood flows out more rapidly. Sometimes the skin in this species of aneurism preserves its colour for a long time; at others, it becomes all at once livid, and of a colour indicating the approach of mortification. This last is owing to the laxity of the cellular parts, by reason of which the blood gets into immediate contact with the skin; and on this occasion a real mortification sometimes takes place.

The third species of aneurism was first discovered by Dr Hunter, who gave it the name of *varicose* aneurism. In it, the swelling is most remarkable in the vein which directly communicates with the wounded artery; but if there are any considerable anastomosis in the neighbourhood, the veins which form them also swell. The tumor disappears upon pressure, principally by reason of the blood being pushed forward to the heart through the veins; and, when the aneurism is large, a strange kind of hissing noise is heard on applying the pressure. This kind of noise indeed is constantly heard in the varicose aneurism; and there is likewise a tremulous motion always perceptible in the tumor. It is not effected by tying a ligature on the limb below the wounded part of the artery, but disappears by slight pressure with the finger upon the vein, so as to shut up the orifice of the wound; or by compressing the artery above it
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so effectually, as to stop the circulation in the artery, without affecting the veins at the same time. In this case, the swelling will not appear again until the compression upon the artery be removed: Or, if the vein be compressed a little above as well as below the orifice of the artery, all the blood may be forced into the artery through the orifice, from which it instantly returns on the removal of the pressure.

This kind of aneurism, when it has continued long, produces at last a very remarkable change in the size of the artery itself; the trunk above the orifice being greatly enlarged, and that below being equally diminished. The size of the lower part of the artery is naturally diminished, because a great quantity of the blood flows out through the orifice into the vein, whence the lower part not being distended as usual, naturally contracts and diminishes in size; but it does not so easily appear why the upper part should be enlarged. In other cases, we find that a diminution of resistance in the vessel, or an increase of the moving power, will produce a dilatation. Thus, if the coats of an artery be wounded while the impulse of the blood continues the same, the consequence will be a dilatation in the wounded part, or an aneurism, as has already been explained. In the arteries, however, there seems to be something peculiar; for an absolute

stoppage

stoppage of circulation through them, as when a large trunk is totally cut off, and tied up, in amputations, does not appear greatly to enlarge the superior part of the vessel. In this case the lateral branches enlarge, and convey a much greater quantity of blood than they formerly did; whence it would appear, that the more blood that passes through any vessel, the larger it will become. Now, in the varicose aneurism, where the blood finds an easy passage through the wounded part of the artery into the vein, the resistance must be much less than where the vessels are whole. The lateral branches therefore will be less distended than before; because the elasticity of their coats, and the minute division into capillary extremities where they join with the vein, form a very considerable obstacle. Hence, more blood flows through the upper part of the large trunk than before, and the vessel thus becomes enlarged, as has been already said.

Aneurisms sometimes ensue from a natural disease in the arteries themselves; and there have been many instances of one arising in a different part of the body, as soon as another had been extirpated in a former one. They are likewise frequently produced in the internal parts, by such great bodily exertions as weaken and strain the arterial coats, and sometimes rupture them.

them. In the external parts, however, they seldom take place without a wound in the vessel, or other violence applied to it; and one of the most frequent causes is unskilfulness in blood-letting, where the artery lies immediately below the vein, and the lancet passing through both sides of the latter, pierces the coats of the artery, either partially, or quite through. In either of these cases there is danger of an aneurism, which will be true, false, or varicose, according to the different circumstances. It is not, however, at all times easy to know when an artery is wounded, even though the coats be entirely pierced. The following are the only certain methods of determining this point, viz. 1st, When the blood does not cease to flow from the wound, after a compression has been made sufficient to bring the sides of the vein together. The flowing of the blood *per saltum* has been supposed an absolute criterion in this case; but this cannot always be depended upon; for if the vein be directly above and very near the artery, the pulsation of the latter will affect the vein, so that the blood will flow out from it almost in the same manner that it would have done from the artery itself. 2^d, The colour of arterial blood is very easily distinguished from that which flows in the veins; the former being of a beautiful scarlet or crimson, the latter much

darker. 3d, By pressing upon the vein below the orifice, we may always, with certainty, stop the flux of blood from it; but, if the artery be wounded, this pressure would be so far from doing any service in restraining the hæmorrhage, that it would render it worse.

When once it is certain that an artery is wounded, every possible method should be taken to prevent the formation of an aneurism. For this purpose it has been directed to tie up the arm very hard, by putting on many compresses, along with a piece of money, or some such hard substance, to prevent the sides of the wound in the artery from separating, so that the blood cannot flow out; and thus the wound may soon be filled up. To this practice, however, there are great objections. If we make the pressure so strong that the sides of the artery meet, there is an absolute stoppage of the circulation through the limb; and if we press together only the sides of the vein, the check thus given to the reflux of the blood makes a greater resistance to that flowing through the artery; and thus the sides of the wound are forced more open than if there had been no pressure at all. Instead of this, therefore, the method directly opposite seems more likely to be attended with success. As soon as it is certainly known that an artery is wounded, as
much

much blood as the patient can bear to lose ought to be allowed to flow out through the wound ; the patient ought to be put upon a low diet, to use purgatives frequently, and to be let blood occasionally for some time, that the action of the arterial system being rendered as low as possible, the wound in the artery may have time to unite ; after which his strength may be recruited by proper means. The lips of the external wound should be laid together, and the blood stopped only by means of a slight compress of cloth gently tied on. By this method we may sometimes succeed in uniting the divided parts of an artery, without having recourse to any difficult operation ; though at others, every thing that can be done in this way will fail, and we must then have recourse to the operation.

When the aneurism happens to be of the true kind, it is always proper to try what can be done by means of pressure ; at least, while the tumor is yet in such an early stage that the blood can be pressed entirely out of the sac into the artery. Thus, the increase of the tumor may, for a long time, be prevented ; or, in some cases, even an absolute cure effected : Where pressure is applied, however, it ought always to be gentle ; the bandage composed of soft materials, endowed with some elasticity, which

which might yield to the pulsation of the parts. A tight and hard bandage would rather bruise and weaken the parts, than strengthen them; and here the only use which we can suppose pressure to answer, is to afford support to the parts till they naturally recover their tone. Some have recommended, during the use of this pressure, a low diet, purgatives, and blood-letting; but it seems difficult to conceive how we can strengthen any particular part of the body, at the same time that means are taken to induce a general laxity and debility over the whole. This treatment is particularly applicable to aneurisms on the trunk of the body, and other parts where the operation is inadmissible; exercise, if violent, at any rate must be bad, especially of the limb where the aneurism is seated, and in aneurisms on the trunk is almost totally to be rejected.

When the method of compression is found ineffectual, and the aneurism is situated in such a part of the body that the operation can safely be performed, whether it be of the true or spurious kind, the artery is first to be compressed above the tumor by means of the tourniquet. The limb is then to be secured by an assistant; after which the operator must make an incision through the skin, cellular substance, aponeurosis of the biceps, the fascia of the thigh, or any
other

other tendinous expansion or muscular part under which the tumor may lie along the whole extent of it, carrying the incision even somewhat above and below its extremities. Different methods of proceeding are recommended in the after part of the operation. The common method is, to dissect away every membrane which covers the artery from another till the vessel itself is laid bare. But this is often extremely tedious ; and, as it is common to find membrane upon membrane to a great thickness, formed by the coagulable lymph of the blood, a preferable method therefore is, after the skin and cellular substance are divided, to make an incision into the tumor itself with a lancet, of a magnitude sufficient to introduce a finger. This being done, a blunt-pointed bistoury (represented Plate II. Fig. 6.) is to be run up upon the finger upwards and downwards through the whole length of the tumor, so as to lay it fairly open from beginning to end. This being done, the coagulated blood is to be taken out of the cavity with the fingers, which are found to answer the purpose better than any instrument that has yet been invented. This being removed, together with the tough membranous filaments commonly found along with the sac, the cavity of the tumor must be quite dry and cleared from the blood. The tourniquet is then to be

be slackened, in order to discover the place of the artery itself; and the most proper method taken to prevent the blood from flowing any more out of it. The best method of doing this, which has hitherto been invented, is to obliterate the cavity of the artery entirely by means of ligatures. With this view, the surgeon is to introduce a small probe into the orifice of the artery, in order to raise it from the neighbouring parts; or to do this, he may use a pair of dissecting forceps, which is much preferable to the probe; so that a ligature may easily be passed round it, without including any of the nerves, which would produce a great deal of mischief. If the aneurism is situated near the joint, either of the ham or elbow, it will be proper to bend the joint, in order to relax the artery, by which means the operation is much more easily performed than otherwise. This being done, the artery is to be tied both above and below, in the manner directed in the last chapter; only using a blunt needle in place of a sharp one, for fear of wounding the contiguous parts. The sides of the needle should also be flat, without any ridge in the concave side, lest it should thus wound the lower part of the artery.

Having made the ligature first on the upper part of the vessel, the tourniquet is next to be unloosed,

unloosed, in order to see whether any blood is now discharged by the wound in the artery or not. This will always be the case where there are any considerable anastomoses between the upper and lower parts of the arteries, the mouths of which open into the trunk but a little space below the aneurismal sac. Hence, the more blood that issues from the wound through the orifice of the lower part of the trunk, the greater hope there is of a favourable termination of the disease *ultimately*; for this shows, that the anastomosing vessels are large, and their mouths situated near the aneurism; but though this should not be the case, there is no reason to despair of a thorough cure; for there are many instances of the use of the limb having been entirely regained, when no blood flowed from the under part of the wound. At any rate, however, we are not to remain satisfied with one ligature upon the artery; for there is always danger of an hæmorrhage ensuing upon the full return of the circulation; and, for the greater security, it will be proper to leave the tourniquet loose upon the limb for three or four days, that the flux of blood may be restrained in case of the artery bursting out. The ends of the ligatures are to be left of such a length, that they may lie quite over the edges of the wound, so that they may be more easily withdrawn

withdrawn when necessary ; the wound must be covered with soft lint, a pledget spread with soft emollient ointment being put over that, and the whole secured by a compress and bandage, the latter making two or three turns above, and as many below the middle of the wound, but by no means rolled tight. The patient should then be put to bed, and the limb placed in a relaxed posture upon a pillow, in such a manner as to give as little uneasiness as possible. As the operation is always tedious and painful, a large doze of laudanum should be given as soon as he is laid into bed. It is also proper to warm the limb by artificial means, as it generally becomes numbed and cold immediately after the operation. Warm flannel, either dry or moist, repeatedly applied, is proper ; and in the space of ten or twelve hours, sometimes much sooner, the heat begins to return ; nay, sometimes becomes preternaturally great, after which the warm applications must be omitted. The feeling also returns as soon as the circulation is thoroughly restored. The patient should be well supplied with cordials and nourishing diet, when in a low reduced state ; but kept on a low diet when of a plethoric habit : Sometimes the pulse at the wrist is perceptible immediately after the operation is performed ; but this happens only in particular cases, where the brachial artery

artery divides above the articulation of the elbow. About the fourth or fifth day, however, a very weak pulse is commonly observed in the under part of the limb, which becomes gradually stronger, and the patient, in proportion, regains the use and feeling of the parts. In some cases, however, the event of the operation is less favourable than what is just now described. The limb, instead of being warm, continues cold and insensible, and at last begins to mortify. The mortification which now comes on, as it arises from a defect of blood, cannot therefore be cured by any other means than amputation. This, however, cannot be any objection to the operation for aneurifms in general; because it more frequently terminates in a favourable manner than otherwise. When it does terminate in the most favourable manner, there will seldom be an appearance of laudable matter before the fifth or sixth day; and about this time an emollient poultice ought to be applied for a few hours, in order to soften the dressings. The ligatures may be let alone for some time longer, till they drop off of themselves. The dressings may be renewed every second or third day, according to the quantity of matter produced, and the fore in general heals easily.

As the operation for the aneurifm, though generally successful, does not always terminate

in a favourable manner, other methods have been attempted to heal the artery without any ligature, so that the circulation may still continue, and the dangerous consequences above mentioned may be certainly avoided. One of these is, as soon as the opening into the artery has been discovered, to apply a piece of agaric or other styptic substance to it, by which means the flux of blood may be restrained, and the wounded artery allowed to heal of itself. Where this is attempted, agaric is undoubtedly preferable to the caustic astringents, vitriol, &c. usually applied in other cases; because these could not fail to affect the artery itself in such a manner as to produce an eschar, the separation of which would either make a larger wound in the artery than before, or weaken it in that place to such a degree, that a new aneurism would probably be the consequence.

A better method, however, seems to be that proposed some time ago by Mr Lambert of Newcastle, viz. to unite the wound in the artery by means of the twisted suture. But this has very seldom been attempted; and the depth at which the artery lies must certainly render the operation very difficult to be performed; but when it is known immediately after blood-letting that the artery has been wounded, there is no doubt that the method just mentioned may
be

be easily and successfully attempted; tho' not, if delayed so long that the lips of the wound in the artery have time to become callous.

The operation, when performed upon false or varicose aneurifms, is precisely of the same nature with what has been already mentioned; but it must be observed, that the varicose aneurism is much less dangerous than either of the other two species; for, when this has attained to a certain size, it generally remains stationary, and may be borne without much inconvenience for a long time. As long indeed as an aneurism can be borne, the operation should be delayed, as the event of this must always be uncertain; and the favourable termination of it depends entirely upon what we cannot know *a priori*, viz. the magnitude and number of the anastomosing vessels in the limb itself.

In many cases, the operation for the aneurism cannot, by any means, be attempted, on account of the situation of the tumor. Thus, in an aneurism of the aorta, of the artery in the groin, &c. it is plainly impossible to attempt any operation; neither can we have any favourable opinion of aneurifms situated on any part of the trunk of the body, on the neck, or in the axilla; for, as we cannot pretend to perform the operation on those, the resistance of the coats of the artery must at last be overcome by the impulse

pulse of the fluids, and the patient must be destroyed. The success of the operation must also be doubtful, where all the arteries are centered in one common trunk. But though this is undoubtedly the case in the superior parts of the extremities, yet in lower situations of the same parts, even the principal artery of the limb may be operated upon with a fair prospect of success; for, after the large artery of any member has passed along the upper part of it, there are always a number of small anastomosing vessels, which not only meet with similar branches below, but with the trunk of the artery itself; and these may dilate to such a degree, as to carry on the circulation in the inferior part of the limb, much more completely than could at first sight be expected. But in all cases where an aneurism is so situated, that compression cannot be applied with efficacy sufficient to secure the patient from a dangerous hæmorrhage, the operation ought not to be attempted.

The success attending the operation for an aneurism must always depend greatly upon the probable chance there is of the circulation going on through the limb after the aneurism has been extirpated; and, of consequence, is more doubtful where the tumor is seated high up, than when it is lower down in the limb; and regard must also be had to the habit of the patient's

tient's body, as well as his age; for those circumstances must have a very great influence upon the event of all operations in surgery. In aneurisms particularly, the difference occasioned by the circumstances just mentioned is very remarkable; for in youth all the parts are so soft, that they easily yield to the impulse of the fluids; the smallest anastomosing arteries then are capable of being greatly enlarged, and thus carrying on the circulation completely; while in old age the direct contrary takes place. In this state the fibres have acquired such a degree of firmness and rigidity, that they are almost incapable of distension, particularly the arterial system; some parts of which are almost, nay, sometimes entirely, ossified; and the smaller arteries may be supposed quite incapable of any considerable distension, and, of consequence, the limb cannot perhaps be supplied with blood sufficient to keep up the circulation, even though the operation be performed in a place, where, in a young person, it would certainly have succeeded.

In March 1783, I was called to visit a gentleman of family and fortune of the age of sixty-three, with a small ulcer upon the inside of his left leg, a little above the internal malleolus. Although every care was taken of it,

it, both by regimen and otherwise, by two physicians and myself, the sore continued to spread for six months, by which time it reached from the heel to the middle of the calf, and extending almost quite round the leg, discharging a vast quantity of ill-digested matter. Under this immense discharge the patient sunk and died. As the gentleman had formerly been healthy, and even during the time he laboured under this disease seemed otherwise little affected, it seemed a matter of no small difficulty to account for the obstinacy of the ulcer. A short time before his death, however, it was suggested by one of the gentlemen who attended, that it was probably owing to an ossification of the arteries; and on opening the distempered limb, which we obtained permission to do after his death, it appeared that the case really was so. The whole of the femoral artery, even to the entrance of the abdomen, as well as the arteries of the leg, were almost completely ossified; a preparation of part of which one of the gentlemen has at present.

Last winter, when dissecting a female subject who appeared to have been near seventy years of age, I was surprised to find *all* the arteries of the body exceeding the size of a crow-quill almost completely ossified.

In cases of this kind, it is evident, that, had an aneurism taken place in any soft part of the artery, no success could have attended the performance of the operation. Indeed the opinions of practitioners concerning the propriety of this operation have been very contradictory, but most of the bad success seems to have been owing to the mere circumstance of age; for, tho' the operation should fail in an old person, in whom it has been performed even low down in the limb, this is not a reason why it may not succeed in a young one, even when performed much higher up. In such as are under fifty years of age, indeed, we may venture to say that this operation will always succeed, if properly performed, and in a place where the circulation can be carried on by the anastomosing vessels.

In those unfortunate cases where aneurisms appear in such parts of the body as cannot admit of the operation, the patient must certainly die by the efflux of blood when the sac bursts; the only thing therefore that can be done is by palliatives, to prolong life as much as possible. A low diet, perfect rest of body, and gentle compresses on the tumor, are almost all that can be attempted. The bursting of the tumor is always occasioned by the mortification of the skin; and the aneurism bleeds gently at intervals

vals for some time, till at last it can no longer be restrained by any means whatever. As some applications are found to restrain the progress of putrefaction more than others, it would perhaps be serviceable to make trial of these as soon as the discoloration of the skin shows that there is a tendency of the tumor's beginning to burst, for this is always the first symptom of the approaching fatal event.

CHAP. VI.

OF INFLAMMATION.

INFLAMMATION, in general, is of such an extensive nature, that there are but few complaints which can fall under the notice of the surgeon that do not begin with it, or are not attended with it in some of their stages. The symptoms attending it are various, according to the parts of the body which are inflamed. In the cellular substance and muscular parts, it occasions pain, swelling, redness, and the tumor is therefore called a *phlegmon*. In the nervous parts, and, as is supposed, in the tendons of the muscles, it occasions most violent pain, convulsions, locked jaw, with other frightful complaints,

Fig. 6



Fig. 4



Fig. 2



Fig. 1

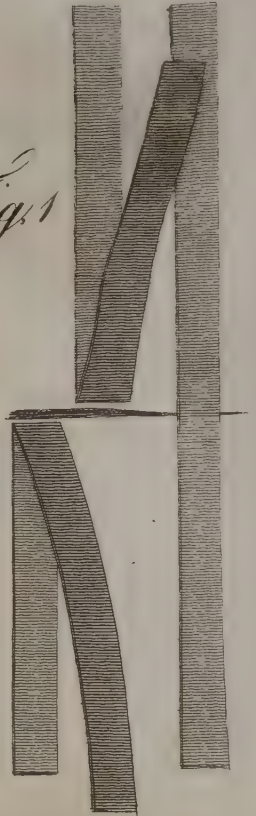
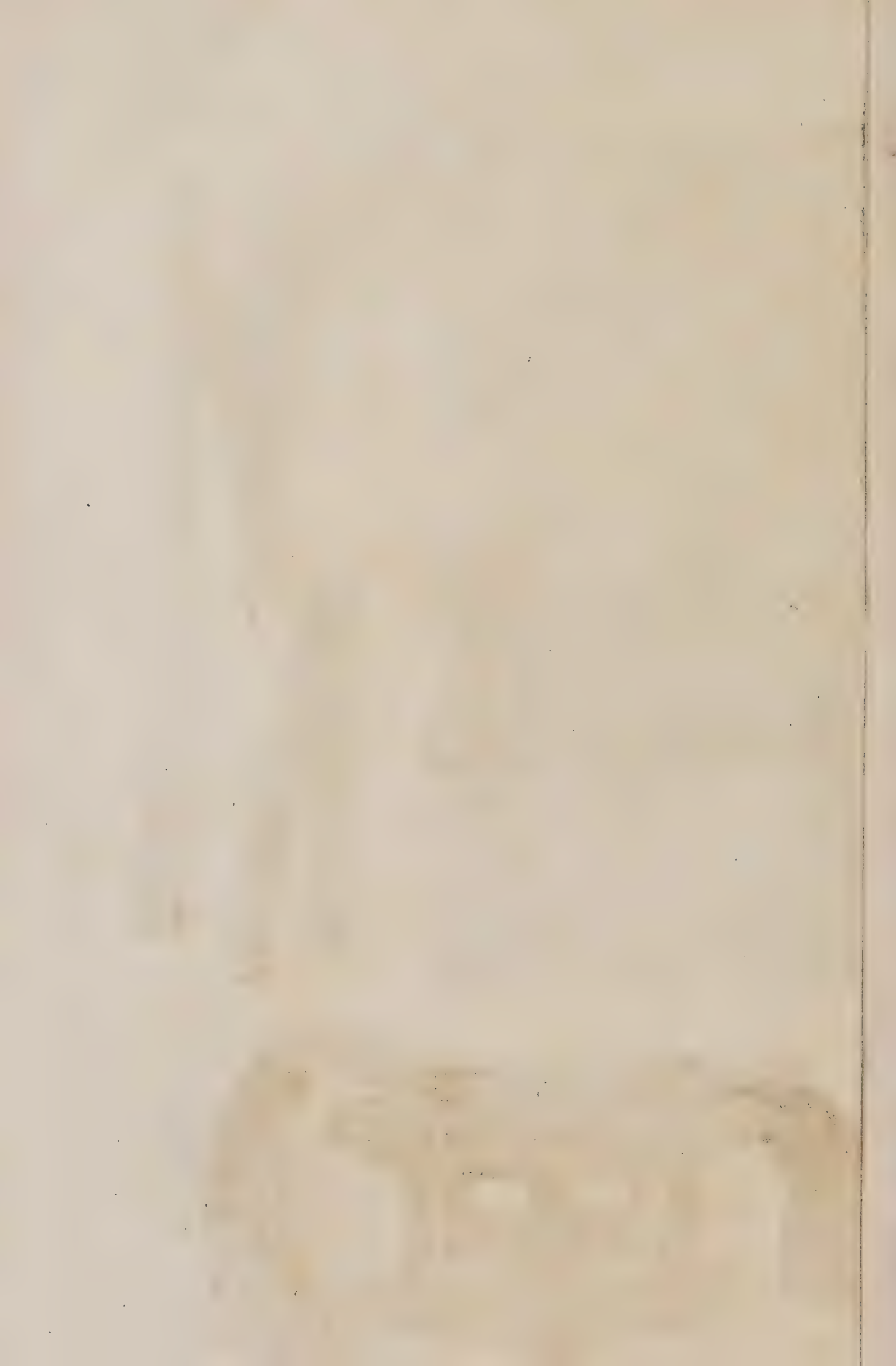


Fig. 5



Fig. 3





plaints, terminating frequently in death. In the periosteum of the bones, it occasions violent and deep-seated pains, which cannot be allayed by any external remedy, and which sometimes terminate in the destruction of the bones themselves. In any of the viscera, the symptoms are the same as in the external parts, only that the body is more disordered in proportion to the importance of the viscus affected. Thus, when the lungs are inflamed, there is a violent difficulty of breathing, attended with fever. Inflammations of the diaphragm are attended with hiccup, delirium, &c. as are those also of the dura and pia mater, and the internal periosteum of the cranium. On the surface of the body, an inflammation is attended with a particular tension, and a red or rather purple like colour, somewhat inclining to yellow, accompanied with great pain, small serous vesications, and sometimes apt to degenerate into a gangrene. This complaint is called an *erysipelas*; and when it attacks any of the internal parts, whose surfaces are liable to it as well as that of the whole body, it is extremely dangerous.

The cause of inflammation has been frequently investigated by physicians, but with no great success. Boerhaave ascribed it to an obstruction in the small arteries, arising from a viscosity or lentor in the blood, as well as to a variety of

accidental causes which it is needless to enumerate at present. Dr Cullen and others, with more probability, ascribe the cause of inflammation to an affection of the vessels, rather than of the blood. On Boerhaave's supposition, indeed, it is difficult to see why the inflammation should ever be confined to any particular place; for, as the blood is dispersed through the whole body, if it excites an inflammation in one part, why should it not do the same over the whole system? The blood, when drawn off in diseases attended with inflammation, does indeed show signs of a separation of gluten from the rest of the mass which lies on the surface of the crassamentum; but this seems rather to be the effect than the cause of the inflammation.

The proximate cause of inflammation, is, by Dr Cullen, supposed to be an increased action in the vessels of the inflamed part, because there appears always an increased impetus of the blood in these vessels, though the action of the heart be not always evidently increased. The cause of this increased action, in many cases, is evidently the application of stimulant substances to the skin. In other cases, where no such application is evident, the Doctor has recourse to the doctrine of spasm, which he had already considered as the cause of fever in general. In many cases, therefore, he says, that the nature
of

of inflammation may be explained in the following manner: “Some causes of inequality in the distribution of the blood may throw an unusual quantity of it upon particular vessels, to which it must necessarily prove a stimulus. But further, it is probable that, to relieve the congestion, the *vis medicatrix naturæ* increases still more the action of these vessels; and which, as in all other febrile diseases, it effects by the formation of a spasm, on their extremities. A spasm of the extreme arteries, therefore, supporting an increased action in the course of them, may be considered as the proximate cause of inflammation, at least in all cases not arising from direct stimuli applied; and even in this case, the stimuli may be supposed to produce a spasm in the extreme vessels.

“That a spasm of the extreme vessels takes place in inflammation, is to be further presumed from what is at the same time the state of the whole arterial system. In every considerable inflammation, though arising in one part only, an affection is communicated to the whole system, in consequence of which an inflammation is readily produced in other parts besides that first affected. This general affection is well known to physicians under the name of *Diathe-sis Phlogistica*. It appears most commonly in persons of rigid fibres; is often manifestly induced

duced by the tonic or astringent powers of cold; is increased by all tonic and stimulant powers applied to the body; is always attended with a hardness of the pulse; and is most effectually taken off by the relaxing power of blood-letting. From these circumstances it seems probable, that the diathesis phlogistica consists in an increased tone or contractility, and perhaps in an increased contraction of the muscular fibres of the whole arterial system. Such a state of the system seems often to arise and subsist for some time without the apparent inflammation of any particular part; but such a state of the system renders it likely that a spasm may at the same time readily arise in any of the extreme vessels, and a particular inflammation be there produced. It does, however, appear also, that the general diathesis frequently arises from inflammation begun in a particular part."

The doctrine of Boerhaave concerning obstruction and a lentor is strongly contested by the Doctor. "He supposes it to have arisen from the appearance of the blood, when drawn off in inflammatory disorders; but the gluten which appears in these cases is certainly known to be an ingredient in the blood at all times; and its appearance in inflammatory disorders is only owing to its separation from the other parts of the vital fluid. Again, there are no evidences that
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any lentor in such cases do really prevail, nor of the blood being thicker in cases of inflammation than at any other time. He supposes also, that nature always provides against such a viscosity of the fluids; and that there is always such a large quantity of water present as must prevent the thickening of the fluids to such a degree. In the particular case of inflammation also, there are many circumstances which render it probable that the blood is thinner than usual; and the Doctor even supposes that no such lentor as Boerhaave mentions does ever take place."

It has likewise been supposed, by those who favour the doctrine of obstruction, that an inflammation may arise from what is called an *error loci*; that is, the entrance of red globule into a vessel not fit for transmitting it. But this appears to Dr Cullen no better founded than the other: "For the motion of the blood," says he, "in the extreme vessels is so weak and slow, as readily to admit a retrograde course of it; and, therefore, if a particle of blood should happen to enter a vessel whose branches will not allow of its passage, it will be moved backwards, till it meet with a vessel fit for transmitting it; and the frequent ramifications and anastomoses of the extreme arteries are very favourable to this." He allows, however, that, on some occasions, an *error loci* does really happen, though
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not frequently, and, for that reason, can but rarely be the cause of inflammation: And, lastly, he supposes, that though an obstruction should even take place, it will not be sufficient for producing the effects, and exhibiting the phænomena of inflammation: "Obstruction, therefore," says he, "from a matter stopping up the vessels, is not to be considered as the primary cause of inflammation; but, at the same time, it is sufficiently probable that some degree of obstruction does actually take place in every case of inflammation. The distension, pain, redness, and tumor attending inflammation, are to be explained only by supposing that the extremities of the arteries do not readily transmit the unusual quantity of blood impelled into them by the increased action in the course of these vessels. Such an obstruction may be supposed to happen in every case of an increased impetus of the blood; but it is probable that, in the case of inflammation, there is likewise a preternatural resistance to the free passage of the fluids."

This is a summary of Dr Cullen's doctrine concerning inflammation. It is obvious, however, that in all cases of inflammation, there is, from some cause or other, an accumulation and partial stagnation of blood in the inflamed part; and this, instead of showing an increased action
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in the vessels of the part, shows the direct contrary, and that there is a deficiency of action. The swelling of the part shows that there is an accumulation, or that the vessels contain more fluids at this time than they did in a natural state. We must remember that the blood and other fluids are not propelled to the extreme ramifications of the arteries by the mere force of the heart alone. The arteries themselves, and every part of every artery, contribute towards this propulsion. If, therefore, any part of an artery loses its contractile power, the blood can pass through that part only by the force communicated from behind, and must, of consequence, be transmitted with more difficulty, than if the force of that part of the artery had been joined to the rest in propelling it. Hence there must be a partial accumulation of blood, and a detention exactly as in the case of an aneurism, where one part of an artery is rendered weaker than the rest. If we can conceive, therefore, an infinite number of small arteries, each of which is dilated in a certain degree so as to occasion pain, we have then a distinct notion of inflammation; which, in this view, must appear rather to consist in a paralysis, than a spasm of the vessels immediately affected.

The kind of inflammation most frequently met with is that of the cellular membrane called
phlegmon.

phlegmon. This is always attended with heat, throbbing pain, redness, and swelling; and if the inflamed part be of large extent, with a considerable degree of fever also. After this has continued for some time, if the inflammation is to terminate in the most favourable manner possible, the pain becomes less, the swelling subsides, the fever and every other symptom gradually abate, till at last the part is wholly restored to its natural size and colour. This termination of inflammation is called *resolution*.

If, however, instead of any abatement of the symptoms, the fever should increase, as well as the heat, pain, and tension, it becomes probable that the solid parts of the tumor will be destroyed, and both these and the fluids will be blended together into a whitish thick matter called *pus*. The signs of its beginning to form, are an increase of size in the tumor, and its becoming prominent in the middle, it gets a clear shining appearance, and becomes less painful; the patient is also seized with shiverings, and the violent symptoms of fever abate, and the fluid is found to fluctuate underneath. This kind of termination is termed *suppuration*, and is the next best way in which an inflammation can terminate. If the pain, redness, and tension of the parts however increase, with a proportional increase
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of the fulness of pulse and other febrile symptoms, without any increase of size in the tumor ; it is then to be feared that a gangrene will ensue. The signs of this disastrous event are a change of colour in the part affected, which, from being of a bright red, comes to assume a livid hue. Small vesicles, filled with thin and acrid serum, arise on its surface ; the pain is indeed diminished, but the pulse sinks, and the tumor becomes flaccid, and at last quite black.

Besides the three ways above mentioned, in which an inflammation may terminate, the following have likewise been observed. One is, when, instead of resolution or suppuration, a part of the mass of blood is effused, most probably by a rupture of the vessels into the adjacent cellular texture. This takes place principally in inflammations of the lungs, where it occasions instant death. Another takes place in some inflammations on the surface of the body, where a fluid is poured out below the cuticle, which, being too gross to pass through its pores, separates it from the true skin, and raises it up like a blister. A third way, is by the exudation of a viscid substance from the surface of the internal viscera when inflamed, and the effusion of a thin serous fluid into the cavities wherein the viscera are placed. On this last principle it is possible, I think, in some instances which I have observed,

to account for peripneumonies terminating in hydrothrax.

With regard to the cure of phlegmon, the principal thing to be kept in view, in every case, is to terminate the disease by resolution; though sometimes even this mode of terminating it is found to be improper, as in swellings which succeed to fevers, &c.; for, as by these nature seems to define an outlet for some superabundant fluid, the interrupting of this operation might be attended with danger. Swellings of this kind therefore ought always to be brought to suppuration as quickly as possible. In all cases, however, where the inflammation is the consequence of the activity of the system occasioned by the stimulus of some disease, as in the case of venereal buboes, resolution is to be attempted.

In scrophulous swellings, where the tumor is of a dull and indolent nature, unattended with any great pain, or other concomitant signs of inflammation, it may be more proper to leave them entirely to the operation of nature; for repellent applications are frequently dangerous; and, when the tumors are opened either naturally or artificially, the ulcers they leave always prove very troublesome to cure. It is also well known that swellings of this kind may be allowed

lowed to remain for many years without any risk to the patient.

In all cases of phlegmon, however, where the tumor is not evidently of a critical nature, or of the kind last mentioned, it is proper to attempt a resolution. This is to be done, in the first place, by removing, as much as possible, every external cause of inflammation, such as extraneous bodies of every kind, irritating substances, &c.; and, in the next place, by the application of sedative and emollient substances.

Of all the sedatives hitherto discovered, lead, especially when dissolved in vegetable acids, is found to be the most efficacious, in so much that almost the *immediate* consequence of applying lead externally is an abatement of the pain, tension, and other symptoms of inflammation. An objection, however, has been raised against the too free use of lead, even when externally applied, from the deleterious effects which it is known to produce when taken internally. But this seems not to be well founded; for, though it cannot be denied that bad symptoms have sometimes ensued from its being taken into the body, yet there is not any fair instance of its having ever been attended with any such consequences when applied externally. With regard to the most proper mode of applying the remedy, saccharum saturni seems to be preferable to any other,

other, or at least not inferior to any that has yet been invented. It has indeed this advantage over all others, that, by using it, we are much more certain of the quantity of lead made use of than in any other way. Goulard has cried up his *extractum saturni* beyond every other preparation that has yet appeared, but apparently without any good reason; for, though both this and the *acetum lithargyræ* are of the same nature with the *saccharum saturni*, yet it is impossible to know how much of the metal is taken up by the acid, unless we crystallize it; and, as we have the *saccharum* already crystallized to our hands, it seems much more proper to make use of it; and a solution of about half an ounce of the salt, in two ounces of vinegar, and one ounce of spirit of wine, with the addition of two pounds of water, seems to be a prescription as effectual as any. The addition of vinegar renders the solution more complete than it would otherwise be; and, indeed, without it, the lead will fall in considerable quantities to the bottom. M. Goulard's *argente-mineral* water, as he calls it, is made by adding two tea-spoonfuls of an extract made from a solution of litharge in vinegar to a quart of water, and four tea-spoonfuls of brandy. The quantity of the extract and brandy must be diminished or increased

increased according to the nature of the disorder, or the sensibility of the part.

Emollients have been recommended as very effectual remedies in inflammations, and very often are so when the tension and irritation of the skin are troublesome: but, unless these last mentioned symptoms prove very disagreeable, it is undoubtedly much better to have recourse to the preparations of lead already mentioned.

The vegetable acid, by itself, has frequently been applied with considerable advantage in cases of inflammation. The most effectual way of using it is in the form of a cataplasm, mixed with the crumbs of bread. But, while we make use of these remedies, it is necessary, at the same time, to keep the body cool, by gentle laxatives of the neutral salt kind, such as cream of tartar, sal de Rochel, &c.; and also to use leeches, cupping and scarifying, as near as possible to the part affected; and, in every case of inflammation, it will be proper to keep, not only the diseased part, but the whole body in a state of rest, and to enjoin the patient to use a cooling diet, and to abstain from fermented and spirituous liquors.

The above remedies will commonly prove successful in slight cases of inflammation; but, when any considerable degree of fever takes place, blood-letting always becomes necessary;
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along with which, gentle laxatives and diaphoretics are to be used. When the pain is very severe, opium must be prescribed ; but, unless it is given in considerable dozes, it will not produce the desired effect.

By a due attention to all circumstances, it is probable that most inflammations will begin to resolve in three or four days. The resolution is known to take place, by an abatement of the pain, and other inflammatory symptoms, without any appearance of gangrene. But, on the other hand, if the symptoms increase, and the tumor begins to turn soft, it is a certain sign that suppuration is about to take place. When the signs of suppuration appear, therefore, it is absolutely necessary to abstain from all the remedies proper for promoting resolution ; though in this also we must pay regard to the part affected, as well as to the cause by which the inflammation has been produced. In the cellular membrane, we know that all inflammations terminate much more speedily than when any nervous or tendinous part is affected ; and thus in inflammations of the testicles, or of the eyes, we may continue for many days, or even weeks, in the application of discutient remedies ; nor are they to be discontinued until the most evident symptoms of suppuration have taken place ; in which case we must act as in other suppurations.

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The remedies most commonly applied to promote suppuration, are warm fomentations and cataplasms ; but, though these are very proper, yet it is absolutely necessary to renew them much more frequently than is commonly done, if we mean that they should produce much effect. The reason of this is, that heat itself greatly promotes suppuration ; and it is probable that the cataplasms act only by means of their heat. When these therefore are allowed to cool, which must be the case if they are renewed only once or twice a day, the evaporation from the inflamed part renders it much colder than it would otherwise have been had no such remedy been applied. The best method, therefore, to promote suppuration, is to foment the part well with pieces of flannel wrung out of warm water, applying them as hot as the patient can bear, which will be from 120 deg. of Faren. therm. down to 112, never almost lower. The fomentation is to be renewed four or five times a day, and continued for at least half an hour at a time ; immediately after each fomentation applying a warm cataplasm, which ought to be changed every two or three hours at farthest.

The most proper cataplasm to be applied in these cases is bread and milk, with a certain proportion of butter or oil ; for, though roasted onions, garlic, and other acrid matters, have been

been recommended, yet they seem to be of service only by augmenting the inflammation when it is too languid; and this may be more effectually done by means of a little strained galbanum put upon the most prominent part of the swelling before the application of the poultice, or by mixing some cantharides along with them. These stimulating medicines are particularly useful when the tumors are of a cold and indolent nature, and the patient cannot be confined to the house, and of consequence cannot have his cataplasms and fomentations applied, as might otherwise be done. Dry cupping near the part affected, or upon it, is likewise of advantage where the inflammation is languid; and, in cases of the cold and indolent tumors just mentioned, is perhaps superior to any other remedy. In all cases, after the tumor has become soft, and the fluctuation of matter is perceived, it must be treated as already directed in the case of abscesses.

Sometimes inflammations terminate neither by resolution nor suppuration, but in a much more unfavourable manner, *viz.* by gangrene, which is an incipient mortification. The word *gangrene* is commonly understood to signify such a state of the fluids as gives them a tendency to putrefaction; while that state in which the solid parts are likewise affected is termed a *sphacelus*. By some writers this disease is divided into three
2 kinds;

kinds, 1st, The *gangrene*, in which the fluids are affected as already mentioned; 2^d, The *sphacelus*, or compleat mortification, in which the solid parts are destroyed; And, 3^d, *Ecthymene*, in which not only the part immediately affected is mortified, but the whole blood and fluids of the body have a gangrenous tendency, so that it most commonly ends in death.

The tendency of an inflamed part to a gangrene may be suspected from the very great heat and violence of pain in it, as well as from a great degree of fever accompanying it; and, when the colour changes to a dark red, blisters arise on the part filled with a dark coloured fluid; when it becomes soft, flaccid, and insensible, then we know that a gangrene has actually taken place. As the disease proceeds, the pain first abates, then the part becomes insensible, the colour becomes livid in the middle with a yellow margin; and, though wounds be made in the affected part, no blood will flow from them. The softness and flaccidity continually increase, and the colour becomes gradually darker and darker, until at last it becomes quite black. It then loses its consistence entirely, and is said to be affected with a *sphacelus*.

A gangrene rarely affects those who enjoy a good habit of body, though even in them it may be brought on accidentally, as by a long and continued pressure on any part of the body,

by which the circulation may be stopped in that particular part. Hence it is no uncommon thing for people who have been long confined to their beds to be affected with gangrenes in those parts of their bodies which are most subjected to pressure; such as the buttocks, back, elbows, &c. and this the more especially if they have been afflicted with fevers of a malignant nature. In like manner, *cold*, by putting a stop to the circulation, may produce a gangrenous disposition in any part exposed to its influence, and actually does so in the northern countries. This kind of gangrene comes on suddenly without any pain, or previous inflammation, and the patient himself is insensible of it, till he is informed of his misfortune by some other. A defect of the circulation in extreme old age likewise frequently induces a mortification in their extremities; and thus a gangrene becomes one of the natural diseases of old age; but the most common cause of this disorder, is the vitiated state of the fluids from an internal cause. Sometimes the whole mass of fluids is in such a depraved state, that the slightest wound, bruise, or scratch, will bring a gangrene altogether incurable, and ending in death. The appearances of the disorder are various, according to the manner in which the juices are affected; but in none is it attended with more terrible symptoms than where there is a general tendency to produce a cancer.

cancer. In this case, the hurting of a wart, or the smallest ruffling or scratching of the skin, will be attended with a flux of sharp humor, gradually consuming the flesh, blood-vessels, and even bones; nor can its destructive progress be stopped, until the injured parts are separated from the body. Mr O'Halleran informs us, that the lower class of people in Ireland are very much subject to an anchylosis and caries of the bones of the tarsus, which may come on either with or without any external injury. "Whether this proceeds," says he, "from their extreme poverty in this land *flowing with milk and honey*, or their often working whole days in marshy grounds, I shall not affirm." In all probability, both these causes may concur in producing this dreadful disease; and to these we may add a third, viz. the want of necessary cleanliness, which is almost always the attendant of extreme poverty.

A gangrene may also proceed from very violent external injuries; such as fractures, contusions, &c.; and, as these are produced with the utmost possible violence by fire-arms, it is evident that gun-shot wounds must, of all others, most frequently have a gangrenous tendency; and experience shows this to be the case. It is evident, however, that, according to the various causes by which a gangrene is produced, the mode of
cure

cure must likewise differ ; and therefore there is no certain remedy which can in all cases be recommended as a cure for the distemper. In most cases, however, practitioners have agreed that it was necessary to scarify the gangrened part deeply, until the lancet touched the sound flesh. The design of this is to promote an inflammation and suppuration on the surface of the sound parts, by which those that are mortified may be thrown off. But it is evident that this practice is founded on a supposition that the gangrene is already stopped in its progress ; for, if the tendency to putrefaction pervades the parts which may yet retain their sensation when the incisions are made, it is evident that these incisions can serve no other purpose than to bring on a gangrene on these sound parts sooner than otherwise it would have taken place. Hence very great mischief frequently ensues from the making such deep scarifications ; and, either from wounding tendons, or some other cause, the mortification advances more rapidly in consequence of the incisions. The good effects of this method have been thought evident on another account, viz. by evacuating the sanies with which a gangrened part is always filled. This indeed is true, but it is certain that the incisions ought never to go deeper than the cellular membrane.

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On these principles, bleeding and other evacuations, must be hurtful, and the cure is to be attempted by such medicines as are most proper for restoring the tone of the solids, and giving proper vigour to the circulation. This in general must be the method of treating gangrenes which arise from an internal cause. That which sometimes attacks the toes and feet of old people is best relieved by opium; the bark, which is very efficacious in other cases, proving sometimes totally ineffectual here.

Instances of gangrene from cold are much less frequent in Britain than in the countries under the same latitude on the Continent. There is, however, only one method of cure for this kind of gangrene, viz. to immerse the part in very cold water, or to rub it with snow; for, if anything warm is applied, or the patient brought before a fire, the part certainly sphacelates; or, if the whole body has been exposed to such severe cold, that the circulation is stopped, the patient will never recover. The proper mode of treatment is, when a person appears frozen to death, either to cover him with snow, or to immerse him in cold water. There have been innumerable instances, in the cold countries, of people thus seemingly restored from death to life. If any of the limbs are frozen, they ought to be treated in the same manner; or, if they are
stiff.

stiff, and cannot be bent, so as to be put into water, they must be covered with cloths dipped in cold water, the patient being all the while kept in a room in which there is no fire. If the cold has been very intense, the water in which the body or the limb is immersed, will be filled with icicles. When this is observed, this water should be changed for another quantity somewhat less cold, and thus proceed by degrees, until the patient is at last put into a warm bed, and may have such warm and diluting liquors as are proper to produce a sweat, by which the bad effects of the cold are commonly removed.

In some cases, however, where the whole body has been exposed to extreme cold, the crasis of the blood is totally destroyed, so that, though the patient recovers, some of the extremities, as toes or fingers, will be affected with a sphacelus. In this case, the only remedy is amputation; but, even when matters appear in the most desperate light, this remedy ought to be used with the utmost caution; for it is impossible to say what degree of injury the solids and fluids of the body may sustain in a consistency with recovery.

The gangrenes which arise from external injuries, such as wounds, violent contusions, &c. must be considered as different from those which have been already described, all of which proceed

ceed from something originally affecting the whole body. In cases of violent contusion, &c. the disorder must be considered as arising only from the injured organization of the parts themselves. The most simple of these cases is that where a gangrene proceeds from the wound of an artery, and, as has already been observed, is sometimes the consequence of the operation for an aneurism. In wounds of the large arteries, especially with swords or other sharp instruments, a very violent hæmorrhage follows, which frequently destroys the patient at once; or, if this be restrained, a gangrene is too frequently the consequence. In this case also incisions are recommended; though, as a gangrene of this kind must arise entirely from a defect of circulation in the injured limb, it is difficult to see how these can be serviceable. Warm fomentations, with a view to relax the anastomosing vessels, would seem more likely to be of service; and, on the same principle, it should appear probable that opium might be of use, in order to quicken the circulation, and relax the vessels, as in the case of old people, where the blood does not circulate, by reason of the deficiency of vital power, and the rigidity of the vessels. Where these fail, the only remedy is amputation.

Of all the accidents, however, which befall the human body, none are more frequently accompanied

accompanied with gangrene than gun-shot wounds; for, by the violent impetus of the ball, all the solids, blood vessels, muscles, nerves, and bones, are mashed into one useless mass, which never can be made pervious to the circulating fluids, and of consequence must be cut off, or they will absolutely mortify. In these wounds, however, the strength of the patient is preserved more entire than in wounds with sharp instruments. In the latter, the divided vessels bleed copiously, as having nothing to restrain the impetus of the circulating fluid; but, in gun-shot wounds, the bullet, either by its heat, or rapidity of its motion, produces a kind of eschar, by the adhesion of which to the wounded vessels all hæmorrhage, for some time at least, is prevented. Thus the inflammation, and of consequence the tendency to a gangrene, in gun-shot wounds, is much greater than in others. In these, therefore, bleeding will more frequently be useful than in other cases; though, should symptoms of a contrary kind appear, recourse must be had to stimulants, cordials, the bark, &c. as in other gangrenes.

Under the class of gangrenous sores, we may reckon the anthrax, or carbuncle. This is a very common symptom in the plague, but comes on also sometimes as a primary disease. The first symptoms are great heat and violent
pain

pain in some part of the body, on which arises a kind of pimple attended with great itching; below which a circumscribed, but very deep seated, and extremely hard tumor may be felt with the fingers. This tumor soon assumes a dark red or purple colour about the centre, but considerably paler about the edges. A little blister frequently appears on the apex, which, as it occasions an intolerable itching, is frequently scratched by the patient. The blister being thus broken, a brown sanies is discharged, and an eschar makes its appearance. Numbers of these pimples are sometimes produced upon one tumor by the patient's scratching them.

The anthrax sometimes appears in those who are affected with putrid fevers, in which case it is attended with great weight and stiffness of the adjacent parts; the patient is restless and pale, the tongue white, or of a deep red, and moist; the pulse low, urine sometimes pale, at others very turbid, with all the other symptoms, in an exaggerated degree, which attend nervous or putrid fevers. Sometimes a little slough of a black colour appears in the middle of the tumor. This was by the ancients supposed to be a part of the body burnt to a cinder or hard crust, by the violence of the disease. This, however, is found to be a mistake; for the slough, consisting of part of the cellular membrane mortified is at-

ways soft, though indeed if the tumor be wholly extirpated, as has been done by some injudicious practitioners, it will be found hard.

The anthrax therefore is considered by the most experienced surgeons, as a true mortification of the cellular membrane, lying under that which contains the fat. Hence it is difficult to discover the extent of the malady; for the sphacelus frequently extends much farther than the circumference of the tumor.

In all cases of anthrax it has been recommended to begin the cure by letting blood; but in those which are attended with any degree of putrid fever, this must surely be very improper. The internal remedies must be of the same kind with those recommended in gangrenes, proceeding from a vitiated state of the fluids. When it is accompanied by high symptoms of inflammation, larger evacuations, and the antiphlogistic regimen are to be used. The only proper termination of the disease is by inducing suppuration, which may throw off the mortified slough; for it is altogether wrong to cut out this, or to extirpate the tumor without suppuration. When the tumor becomes soft it is to be opened, after which a great quantity of thin acrimonious ichor is generally discharged, arising from the adhesion of the mortified slough to the sound parts. The bark is then extremely useful, along with
cordials,

cordials, and sometimes acids. Emollient cataplasms are proper for promoting the suppuration of the tumor ; and after it is opened, the ointments usual in abscesses must be applied. Some have recommended deterfive and antiseptic injections, as decoction of the bark, tincture of myrrh ; and sometimes vitriolic medicines have been recommended. These injections seem to be serviceable, by restraining the too copious discharge of sanies from the mortified sloughs, and cleansing the parts properly after the sloughs are separated. When this is done, the sides of the cavity will frequently cohere in forty-eight hours ; but it is always necessary to make the opening sufficiently wide for drawing out the sloughs when separated, otherwise the external parts might heal over them, which would be productive of very troublesome consequences.

In all cases where a gangrene has continued to go on, notwithstanding every remedy which could be applied, when it has proceeded to the last stage, *viz.* that of sphacelus, it is in vain to think of saving the limb ; amputation must then be the only cure. This, however, must not be attempted while the mortification is spreading, nor indeed until the mortified part has begun to separate from that which is sound. As the sphacelus affects not only the soft parts, but the bones also, the separation betwixt them would
naturally

naturally be completed, if we were to wait a sufficient time, though this is seldom done. Dr Huxham indeed gives an instance of a lady whose entire leg was gangrened up to the joint of the knee. She would not, however, submit to an amputation, but let nature do the work spontaneously, which took up 44 days. A surgeon then cut off the mortified limb, without her consent, and almost without her knowledge. But, though it may be improper to wait for such a length of time, it is by no means adviseable to hurry on the operation too fast. Besides an evident separation of the mortified parts from the sound, it is improper that amputation should be performed before the patient recovers his strength, and the matter becomes thick, and flows in no very large quantity. All the time that the separation goes on, while the mortified part remains, it will be proper to keep it wrapped up with some antiseptic solutions or tinctures, to prevent the offensive stench, which might otherwise be prejudicial to the patient. This indeed seems to be the only use of spirituous and aromatic tinctures or fomentations commonly prescribed for gangrened parts; for, unless the virtue of these could get through the integuments, which cannot be the case, but in a very small degree, they cannot be of any service whatever.

A caries in the bones is a disease of the same nature with a gangrene or sphacelus of the soft parts. Like the gangrene, it arises from a stoppage of the circulation through the bone ; and, as the number of blood-vessels anastomosing with one another is much smaller in the hard bones, than in the soft parts, a caries will very readily ensue from the stoppage of the large artery which enters any bone. For the same reason, a caries likewise very frequently ensues from an injury of the periosteum, for all the blood-vessels of the bone pass through the periosteum. This, however, will not happen unless some considerable artery which enters the substance of the bone be injured, or part of the substance of the bone itself be destroyed.

After a bone has been laid bare, and the periosteum injured, the caries generally comes on before the fourth day, or, if the bone retains its natural colour beyond that time, it is most probable that no caries will take place. The signs of a caries beginning to take place, are the bone's losing its natural healthy appearance, and assuming first a pale white, and then a yellowish colour. In this state, it will sometimes remain for a considerable number of days, growing gradually deeper and deeper coloured, till at last it becomes brown, and then extremely black ; when we may suppose that the mortification is complete in the bone, as we do in the
soft

soft parts, when they assume this colour. Along with this change of colour, the bone becomes gradually full of small holes, the number of which increases every day, until at last the hardest bones become quite spongy. These changes are attended with the discharge of a very fetid sanies from the surrounding soft parts, which becomes more and more acrid as the blackness of the bone advances, and at last acquires a blackish colour as well as the bone itself. After the bone has become black and spongy, the mortified part loosens from the rest, yielding, upon pressure, an oily like matter of an extreme disagreeable smell, and which is of such a particular kind, as to become a diagnostic of the disease. All the time that this disease of the bone continues, the soft parts continue of an unhealthy, pale, and flabby appearance; large granulations of flesh shoot up, which contract the orifice of the sore, though it will not heal up entirely until the carious part of the bone be cast off, and fully separated from the rest. This is effected by means of fleshy granulations arising between the sound and mortified part of the bone, which push off the latter, and at last consolidate into a long lamina themselves.

Caries in bones may be produced by many external accidents, as wounds, contusions, &c.; or it may, like the gangrene of the soft parts, arise

arise from a cacochymy of the blood and juices, in which case it frequently begins with an inflammation of the periosteum. Mr O'Halleran describes it under the title of *gangrene* of the solids, and the cancerous gangrene. It very often attends the venereal ulcers, especially where great quantities of mercury have been taken. In scrofula, likewise, the caries of bones very frequently occurs ; in the scurvy, and all other diseases where the juices become very acrimonious. A mere loss of substance, however, will not occasion a caries in the bones, any more than a loss of substance in the fleshy parts will always occasion gangrene ; for large portions of the cranium are frequently removed in operations of the trepan, and in fractures, without any caries taking place. In general those bones which are the best supplied with blood-vessels, are least subject to caries ; because there are, in these, so many anastomosing vessels, that the destruction of one artery is not attended with any bad consequence ; and the cranium is better supplied in this respect than any other bones.

The cure of a caries consists only in the removal of the diseased parts of the bone, from such as are in a sound state ; for, when once a bone has a tendency to become carious, there is no hope of its being brought back to a sound state, as may sometimes be done with the soft parts

parts when they have a tendency to gangrene. The separation or exfoliation, as it is called, of the bone takes place more readily in such as are hard and solid, as in the middle of the long bones, than in their spongy extremities, or bones of a softer texture. It takes place also more readily, as may naturally be supposed, in young persons where the vital powers are strong than in the old and infirm; also in bones which are well supplied with blood-vessels, better than in those which are not. In vigorous constitutions the exfoliation takes place by means of the natural force of the system; and proceeds in the manner already described, which is a process exactly similar to that by which the gangrenous or sphacelated soft parts are separated from those which are sound. In the case of caries, however, the separation goes on much more slowly than in the gangrene, because the vessels of the bones are both fewer in number and act less vigorously than those of the soft parts. The exfoliation may be promoted by those medicines which promote the separation of the gangrenous soft parts from those which are sound. The diseased part of the bone ought to be fully laid bare, either by a longitudinal, or initial incision, if the diseased part is of any considerable extent; or sometimes it may be necessary to-
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tally to remove some part of the soft integuments.

The mode of cure, in cases of caries, has for a long time been to apply acrid powders, hot and spirituous tinctures, &c. to every bone which was in the least tainted with the disease, or even to every bone that was only laid bare. But this is certainly a very injudicious mode of proceeding, as it is impossible that such powders can penetrate through the substance of the diseased bone, though they may induce a caries in such as are sound, by injuring and inflaming the periosteum. The application of the actual cautery must be looked upon as equally inefficacious and injurious; for, if this be applied in such a manner as to destroy entirely the diseased part of the bone, the heat must necessarily destroy also some part of that which was sound, and thus bring on a new caries. If applied in such a manner as not to do this, it cannot be supposed to be of any avail. Instead of these tedious and uncertain methods of removing the bone, some have boldly recommended to strike off at once the diseased part with a chisel and mallet; but this must be liable to the same objections with the former, viz. destroying part of the sound bone, and thus making the caries worse than before.

In all cases of caries, however, it certainly must be of the utmost importance to diminish

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the diseased and corrupted part of the bone as much as possible ; not only because a thin scale of carious bone must be more easily thrown off than a thick and large one, but because the fetid matter produced by the corrupted bone must undoubtedly be augmented in quantity much more, by allowing a large piece of corrupted bone to remain, than by taking it away. The most approved method of doing this, is by perforating the diseased bone in a number of places, very near one another, with a triphine, or other sharp instrument. It will be known when the carious part is perforated, by the patient's beginning to feel the operation painful ; and, whenever this is the case, the surgeon ought to stop. The perforation ought to be renewed every third or fourth day ; by which means the extent of carious parts will very soon be greatly diminished, and the small corrupted bits which remain between the holes will insensibly moulder away. There are indeed some bones which do not exfoliate or throw off a solid bony scale, though ever so carious, such as those of the carpus and tarsus, the spongy extremities of the cylindrical bones, &c. In these, the carious part insensibly decays, and is discharged along with the dressings. In these cases, setons, which can act on the spongy and rotten part of the bone, when the cord is drawn, are likewise
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of use. Where the caries is of great extent, it will be proper to use such an instrument as is made use of by the coopers for boring the heads of their casks. By this a considerable extent of surface is taken away, and the holes will be separated from one another only by narrow partitions, which being cut through the extent of the carious part, will be very inconsiderable, and will come away insensibly, as already mentioned. When a bone happens to be carious throughout the whole extent, it is common to make use of a common trepan for taking out a piece throughout the whole substance.

In the case of caries, as in that of gangrene, it is the power of the living parts which separates the dead ones ; and, unless this cure be effected by means of this power, it cannot be effected at all. Besides those remedies which invigorate the system in general, therefore, there can little be done farther than removing as much of the diseased part of the bone, with as little injury to the sound parts which lie below as possible, and which can best be done in the method already mentioned. It is, however, of considerable consequence to destroy as much as possible the putrescency and foetor of the matter which issues from it. It is doubtful whether this can be effectually done by any other means than that of invigorating the system by proper medicines.

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Some topical antiseptics, however, are recommended, and probably may be of service, as decoctions of Peruvian bark, camomile, and other vegetables which correct putrescency, solution of camphor in weak spirits, &c. It is also proper to apply a good quantity of dry charpee, that the matter may be absorbed as soon as it is formed. Lime-water is likewise of considerable service in correcting this foetor; and, from the dissolving power of this liquid, it is likewise of service in loosening the adhesion of the mortified part of the bone. After the carious part of the bone is removed, emollient ointments, spread over that which is found, assist in producing the fleshy granulations, which are afterwards converted into bone, better than any other kind of medicines which have yet been tried.

OF ERYSIPELAS.

HITHERTO I have considered these inflammations which are confined to one particular part of the body, whether soft or hard; but that now to be treated of is of a nature entirely different. The Erysipelas is, properly speaking, an inflammation of the skin, and frequently spreads
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over it to a very great extent. It seldom or never terminates by suppuration, but frequently by resolution, and not unfrequently by gangrene. It makes its appearance with hardly any swelling; the colour is of a dull red, disappearing when the part is pressed, but instantly returning when the pressure is taken off. The redness continues to spread unequally, with a burning heat, producing blisters of various sizes, and always terminating in the casting off of the scarf skin.

In this distemper the skin has generally a shining appearance, but there is not any considerable degree of tension, nor any pulsation or throbbing pain, as in the case of phlegmen. On the contrary, it is often attended with violent itching, and always with some degree of fever. When it comes on without pustules or vesications, it is styled the simple erysipelas; but, when these make their appearance along with the other symptoms abovementioned, the disease has the name of St Anthony's fire. The blisters attending it, in this case, are always filled with a yellowish serum.

As the fever attending an erysipelas is sometimes very high, bleeding is frequently indicated; but it has generally been imagined that this was *universally* prejudicial in the disorder we speak of. This, however, seems not to be well

well founded ; for it is certain that bleeding has often been practised with success in the erysipelas, and now forms one of the principal remedies for the disease. A like prejudice, and equally unjust, has taken place against all kinds of humid applications in the erysipelas ; in consequence of which, it has been supposed that nothing can be safely applied in erysipelatous cases but flour, starch, and other dry and insignificant powders. Unctuous applications are likewise rejected, though for no good reason. It is certain that these remedies are not productive of the effects ascribed to them, viz. the promoting the effusion of serum into the vesicles above-mentioned. Both the unctuous applications, and weak solutions of saccharum saturni, have often given instant ease from the pain, without being attended with any disadvantage afterwards ; but, in general, the ointments are preferable to moist applications. When unctuous applications, however, are not attended with any good effect, it has been found of the utmost benefit to expose the affected part to the air, and wet it slightly with the saturnine solution. Warm and moist applications are always pernicious.

In June 1788, I was called to Mr J. M. II.
about 40 years of age, of a strong and
healthy constitution. He complained of great
heat

heat and pain in his penis and scrotum, attended with considerable thirst. His pulse was 116. and rather soft, and the whole complaint seemed to have been the consequence of applying a warm poultice of bread and milk to a very hard and painful swelling on the top of the right buttock, in order to promote a more free discharge of blood from the wounds made by some leeches which had been previously applied.

On examining the affected parts, I found both penis and scrotum excessively red, and swelled immensely, with purple spots already appearing in many places. The swelling which first made its appearance extended from the top of the buttock to the anus ; but, on viewing these parts at this time, neither swelling nor redness were observed ; nor did he complain of any pain ; which symptoms had all gone off as soon as the affection of the penis and scrotum came on. As he was costive, an ounce of crystal of tartar was given, mixed up with a little syrup into the form of an electuary ; a tea-spoonful to be taken every hour till it operates ; the parts affected to be kept dry, and dusted with flour.

Next morning, the whole under part of the penis, as well as its sides, and all the prepuce, appeared of a more livid colour than yesterday, with many small incipient vesications filled with a dark coloured fluid. Similar spots appeared
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on each side of the rapha of the scrotum, about the size of a crown piece each; pulse 124, and feeble. A mixture was immediately ordered, of eight ounces tincture of bark, with an ounce of the powder; a table spoonful to be taken every three hours, and a glass of port every two hours; the livid parts to be kept constantly covered with cloths well soaked in brandy. The symptoms continued as before for three days, only that the parts on the scrotum, becoming completely black, mortified, and a separation began to take place. The blackness in the penis also increased, but no signs of separation appeared. The medicines were continued; but, as the bark seemed to purge him, 100 drops of laudanum were added to the mixture, which was given as before. In three days more, the parts of the scrotum appeared to be completely separated, as well as two small parts about an inch diameter at the bottom, which had only been observed two days before. All these were easily removed, by cutting away some threads of cellular substance which remained. Both testicles were distinctly seen, and were in a sound state. The sores were dressed with straps spread with simple cerate round the edges, and charpie in the middle. The mortified parts of the penis also now began to separate; and so completely had the disease invaded the whole of it, that no

more remained found than about as much as the point of the thumb would cover, extending about an inch forward from the root on the upper part. In two days the floughs were completely removed, the glans appeared perfectly found, as well as all those parts from which the skin had floughed off. His pulse was now no more than 106, and more full than before; his appetite began to mend, and all the bad symptoms to go off. In a fortnight from the time that I first visited him, the swelling was entirely gone off; the fores began to look well; and the discharge, which had been at first very copious, and ill coloured, was now reduced in quantity, and had a good consistence. The fores began to look well, and I now began to draw together the edges of the openings on the scrotum, by means of adhesive plaister, over which was laid a pledget spread with simple cerate; the penis was dressed as usual, and the rest of the medicines continued, except only the laudanum, as he had of late been rather costive. His pulse, appetite, &c. were now as if he had been in perfect health; and about the end of the third week the fores about the scrotum were completely healed. Those about the under part still remained a little open, and the penis was beginning to heal every where from the edges of the fores. The mixture was now ordered to be taken only four times a day, and he was allowed

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four glasses of port in the same time; he was likewise allowed a bottle of porter (a drink of which he had always been fond) in the twenty-four hours. The cure was completed in eight weeks from the time that I first saw him; the openings in the scrotum having coalesced from the edges, by means of straps of adhesive plaister, and the penis being covered with a thin fine skin.

Miss M——, aged 40, of rather a gross habit of body, happened, by slipping her foot when stepping into a coach, to bruise the skin of the fore-part of her leg, from the ankle to near the knee; but, as the pain was slight, little notice was taken of it. Towards the evening of the second day, however, it began to grow painful and hot, with chillness all over her body. The leg was also somewhat swelled, and very red. At night she wrapped it up in flannel, and drank some warm negus, with a view to promote perspiration, by which means she hoped to get rid of her complaints; but, during the night-time, her pain, as well as the burning heat of the parts, were greatly increased, and she became exceeding restless and thirsty, with great heat over her whole body.

As the disease now wore an alarming appearance, she thought proper to send for her surgeon.

geon. He found the whole leg greatly swelled from the ankle to the knee, and every where red, but remarkably so along the whole course of the tibia. Two table spoonfuls of saline mixture were ordered every third hour, and a large cataplasm of bread and milk applied to the leg. A cooling injection was given at night, and the cataplasm continued. I visited the patient next morning, along with the surgeon. Her pulse was upwards of 120, and feeble, her skin hot, with great thirst and parched tongue; many parts of the leg appeared gangrenous, and the swelling extended all along the thigh of the same side to the groin, with a considerable degree of yellowness, but no pain. The poultice was removed, the gangrenous parts washed well with brandy, and cloths dipped in that spirit applied to the parts affected; the rest of the limb wrapped up in flannel filled with flour. Half a drachm of the bark, with a glass of port, was ordered every two hours. At night her pulse was quick and small, the medicines had remained on her stomach, but the gangrene made a rapid progress, and next morning she died.

Mr J. S. aged between 30 and 40, happened to sprain his ankle in going home, but so slightly, that he did not think of calling any medical assistance that night. Next morning, on getting

getting out of bed, finding the pain somewhat increased, I was sent for; but still, as there seemed to be but little the matter with it, I contented myself with ordering him to bathe it frequently with the saturnine solution formerly mentioned, and directing him to sit quiet for a day, laying the limb upon a footstool, with a pillow under it. At this time he had little pain; but in the afternoon, having drunk rather freely of warm rum and water, with some of his acquaintance who came to visit him, the symptoms seemed to be thereby greatly exasperated; for, next day, about one o'clock, I found him in bed, complaining greatly of pain and heat in the ankle and upper part of his foot. The parts were considerably swelled; and he informed me that this augmentation of symptoms had taken place during the night, and that he had a rigor on going to bed. On taking away the flannel I observed the swelling to be extremely great, and to surround the whole foot and ankle with great redness. Sixteen leeches were instantly ordered to be put upon different parts of it, and the discharge of blood to be promoted by warm dry linen rags; and, as soon as this was stopped, four folds of linen, dipped in the saturnine solution, were ordered to be applied to the parts affected, and to be kept on constantly till I should return;

return ; and, in the mean time, a brisk purge or Rochel salt was ordered.

At night, I found that the leeches had bled plentifully ; he had kept the moist cloths constantly applied ; and the pain, heat, and redness, greatly abated. The topical applications were continued, and he had two table spoonfuls of the common nitrous julap every three hours. His pulse was about 100 in the morning, and had not increased in frequency. By next morning, the pain and redness were almost gone, excepting just at the place where he first complained after the accident. Six leeches were ordered immediately, and the bleeding to be promoted as before. At night the swelling was greatly abated, and the pain entirely gone, except on moving the joint. His solution was continued, and the salts repeated next morning. Next day, I found that his salts had operated well ; the fever entirely gone ; little or no pain ; but he continued the saturnine application for eight days longer, though no more symptoms of the disease remained.

M. R. A strong healthy woman of 24 V. years of age, got a bruise on the upper part of her left foot, by which about the breadth of a shilling of her skin was ruffled. The hurt was so slight, that, after applying a little of Turner's cerate,

cerate, no more was thought about the matter ; but, on the 16th of June, eight days after the accident, she was suddenly seized with an uncommon chillness all over her body, but particularly along the spine. On going to bed, she soon became warm, was immediately seized with a headach, and pains in different parts of her extremities, but particularly in that part of her foot which had received the bruise, attended with a sensation of burning heat. Next day, the whole foot and under part of her leg swelled very much, with great pain and heat, which still continued to increase. I saw her this day for the first time, and found her labouring under symptoms of a fever ; her pulse being 112, and strong ; thirst great, and the belly costive ; the leg and foot were quite erysipelatous, particularly the latter, to which, and to the ankle joint, the swelling and deep red colour seemed to be mostly confined. Her menses had been of a due quantity at last period. I instantly took away ten ounces of blood, and ordered eight ounces of the infusion of tamarinds, with two drachms of fenna ; directing at the same time her leg and ankle to be well wrapped up in flannel previously dusted with flour. Twelve leeches were applied to the upper part of the foot, and the flow of blood encouraged with dry cloths, and, after the bleeding was stopped, the foot and ankle.

anckle were directed to be kept moist with a saturnine solution.

June 19th, Physic had operated well, the leeches bled freely, and the foot had been kept constantly moist ; her pulse was no more than 96, and the pain of the foot and anckle much diminished ; the swelling and redness there were also abated, but the leg still continued very painful, swelled, and red. The application of the saturnine solution was continued, and two table-spoonfuls of a mixture of eight ounces of saline julap, made with two ounces of spiritus mindereri, directed to be taken every three hours.

21st, Swelling and redness of the foot almost gone, the leg much as before the laxative was repeated, the mixture ordered only now four times a-day, as she had sweated considerably for near twenty-four hours, and her tongue was moist.

In five days after, the symptoms had entirely disappeared, and she continued free from all complaints until within these two months past ; when, without any evident cause, unless from the pressure of her buckle, an erysipelatous tumor invaded the same foot and anckle ; but was completely removed in five or six days, by the application of leeches, the saturnine solution, and the exhibition of two gentle laxatives.

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In many cases the erysipelas is attended with such a degree of putrescency, that bleeding and other evacuations would be highly improper. The bark, wine, with cordial and antiseptic medicines, are then only to be made use of. The disease has been known to be epidemic, and attended with the following symptoms. The space between the eyes and upper part of the nose were first affected with swelling and inflammation. Next came on itching, redness, pain, low pulse, vomitings, violent headach, &c. If this distemper was treated with bleeding, and other evacuations, the pulse sunk, and the patient died, while, on the other hand, the bark, cordials, and blisters, were found extremely serviceable.

Erysipelas is sometimes the consequence of contusions, particularly when the membranes of the cranium are injured; sometimes it attacks the internal membranes of the stomach and intestines, occasioning vomiting, hiccup, or purging, according to the situation of the disease.

Erysipelas has even been found upon the skin of new-born infants; of which we have several instances mentioned in the Medical Communications, as having occurred in the British Lying-in-hospital. In one of these the child was born with its whole face swelled and inflamed, the left side having a true erysipelas upon it. There

was likewise an inflammation on the legs, feet, and left hand: On each tibia there appeared an oblong flough, of a dark brown colour, almost livid; that on the left being very large. The cure was attempted by employing embrocations and emollient cataplasms, fomentations, and the application of camphorated spirit of wine. This child appears to have swallowed the decoction of bark with great ease, as it swallowed *four ounces* of it daily from the very time of its birth. In three days, the swelling of the face, and other parts, was considerably subsided; but, on the third day, a vesication began to form on the left cheek, and another just above the eye-brow, on the same side. These vesications increased in number and size, especially on the legs, where they extended over the whole limb. Some *confectio cardiaca* was added to the decoction of bark, and pledgets dipped in oil of turpentine were applied to all the parts affected, previous to the application of the poultice. The vesications began to break on the sixth day, and a sanies began to flow from them. Yellow floughs also began to appear in different parts, and the child seemed much debilitated; and, for the last three or four days, had taken *eight ounces* of the decoction of the bark, with one drachm of the *confectio cardiaca* every twenty-four hours. The pledgets applied to the sores

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were dipped in a digestive ointment, with oil of turpentine, and some cataplasme e Cymino. By these medicines the floughs soon began to separate, and the child recovered, though not without the loss of the little finger, the two joints of the finger next to it, and one joint of the middle finger. This distemper was for some time extremely fatal, not one of the children recovering who had been seized with it ; though the bark operated as a specific, and almost all of them recovered upon whom that medicine was tried. In those in whom the disease terminated fatally, a mortification always ensued ; and it was observed, that, in those cases where the disease seized the genitals at first, the danger was always the greatest. The disease was observed to attack the children of weakly women, and of such as were addicted to the drinking of spiritous liquors.

SCHIRRUS AND CANCER.

IT was for a long time supposed by surgeons that a Schirrus is one of the modes in which an inflammation terminates ; but this opinion is by
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no means well founded. Inflammation is always attended with a considerable degree of pain, sudden swelling, and congestion of blood in the part; but this is not the case with a schirrus. The tumor begins without any apparent inflammation, and increases slowly without pain. It is likewise moveable under the skin, which no inflamed tumor ever is. Neither does the schirrus attack indiscriminately all the parts of the body, but is confined to the glands; and chiefly attacks those of the conglomerate kind; though any single conglobate gland may be attacked by schirrus and cancer, as well as one of the conglomerate kind. The immediate cause of the schirrus seems to be an obstruction in the gland itself; most probably in its excretory vessels; by which means, as the influx of the fluids into the gland remains free, while the efflux is impeded, there is of necessity a continual accumulation of the fluid secreted by the gland, and a consequent increase of bulk. Sometimes, however, the increase is extremely slow; nay, the schirrus will remain stationary perhaps for years, and afterwards suddenly increase to an enormous size. After any great increase in bulk, an inflammation, though different from what takes place in other parts of the body, begins to take place in the schirrus; vehement shooting pains are felt at intervals, which grow
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daily more and more violent and constant ; the skin becomes corrugated and discoloured, and the most virulent ulcer, called an open cancer, takes place.

In some cases it is easy to account for that obstruction in the glands which produces schirrus, as it is certain that tumors of this kind frequently arise from blows upon glandular parts. Sometimes they are thought to arise, particularly in the liver, from an excess in the use of spiritous liquors ; and Mr Gooch mentions one case, in which a cancerous ulcer was produced by a child drinking some of the ichor which issued from an ulcerated cancer in another person. This happened when she was in the third year of her age. Some of the liquor in which the cancer had been washed stood in a tea-cup upon the table, and the child unfortunately drank a little of it. The consequence was, that, in about a fortnight, a corroding ulcer seized her tongue, and one side of her mouth, destroying great part of the cheek, both in the inside and outside. This, however, was cured with great difficulty, and she continued well for more than twenty years ; but, having then received a contusion by a fall, an abscess was formed near the articulation of the hip, which could not be cured but with the utmost difficulty. After this she again continued well for fifteen years, when

a small schirrus was formed in her breast, which gradually increased, until at last it occupied not only the whole breast, but the axilla likewise.

From this case it would appear that the cancer is sometimes not merely a local affection of a particular gland, but may be occasioned by a certain disposition of the blood and juices ; for here the whole system seems to have been plainly infected ; and there are many instances of a schirrus and cancer occurring without any apparent cause, that we can scarce imagine any thing else than a total depravation of the system ; which seems also to be confirmed by the frequent instances we have of the return of the disease after ulcerated cancers have been extirpated. This will likewise appear the more probable, when we consider that all obstructions of the glands are not productive of cancers ; for strumous tumors appear as evidently to be glandular obstructions, as cancers do, though their nature is undoubtedly very different. Some eminent practitioners, indeed, suppose that persons of a scrophulous habit only are liable to cancers ; but this seems not as yet to be sufficiently ascertained.

All parts of the body, in consequence of their containing glands, may be affected with cancers ; but those in which the glands are numerous and large are much more liable to them
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than others ; such as the breasts of women, the uterus, the nose, lips, cheeks, &c. ; and these appearances are different, according to the parts of the body in which they are situated. Those in the breasts generally begin with small hard knots, which continue gradually to increase, without any diminution of the hardness, until the tumor breaks out into an ulcerated cancer. As the schirrus augments in bulk, the adjacent veins being compressed by it, become swelled and varicose ; and from their crooked figure have some resemblance to the claws of a crab, whence the disease has obtained its name. When the skin is about to burst, it becomes corrugated, as if scorched, in a manner very disagreeable to look at ; changing its colour at the same time to a reddish or livid blue ; the schirrus likewise now becomes immovable, and adheres to the skin, though at first entirely detached from it. There is never any fluctuation of matter as in a phlegmon, but the corrosive matter gradually penetrates the skin, and, as it were, wears it off. After the skin is broken, the lips of the ulcer send forth large fungous excrescences of various shapes ; while the corrosive ichor corrodes the internal parts, consuming the flesh, and making large cavities in the breast. Sometimes a sudden and fatal haemorrhage is brought on by the destruction of a large blood-vessel, and
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at others the patient is cut off by the continual oozing of the blood from the number of small vessels daily eroded in the progress of the disease.

Another kind of cancers do not rise above the surface of the skin, but consume all the parts around them, something like the *Herpes Exedens*. From this, however, it differs, as the herpes consists of a great number of spots, and makes rapid progress; but the kind of cancer we speak of has only one spot, and proceeds in a more slow and gradual manner. It first shows itself by a thick scale, which in some time casts off, leaving behind it a few small and mealy scales. These are succeeded by a larger and thicker scale, which, after being renewed several times, at last terminates in a crusty scab. The disease being arrived at this stage, shows itself, not by any more scabs, but by an oozing of moisture from the skin, which in a short time is converted into a cancerous ulcer.

Besides these two kinds of cancers, the disease sometimes puts on different appearances. Sometimes it is the consequence of a very small mole or wen, some of which retain the colour of the skin, others resemble warts with ragged tops, and some have a broad base, with the upper parts resembling horns. The last are always elevated above the skin, and give no pain till after
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the disease has been considerably advanced, in consequence of which they are too frequently neglected at first.

All the ulcerated cancers pour out a fluid extremely corrosive to the parts in which it is generated ; and which, from a case above mentioned, appears to be capable of infecting an healthy body with the same disease. This fa- nies has usually a most disagreeable smell, but, with proper care, and the using of such topical remedies as are proper for preventing putrefaction, particularly a carrot poultice, this may generally be avoided.

The cancers last mentioned, which begin with a warty or horny excrescence, generally affect those parts of the body which are the least glandular ; but the others are the most common ; and, of all parts of the body, those in the breast and testes are the most frequent and destructive. In the lips they also frequently occur, and are much more common in the upper than in the under lip. The viscera are subject to this disorder, as has been mentioned of the liver and uterus ; and even the stomach and intestines have frequently been found affected by it. Women are more subject to cancers than men. People of both sexes are more frequently affected about the age of from 36 to 48 years, than such as are younger ; though there have been instances

instances of persons of sixteen years of age afflicted with this disorder, and likewise of those in an advanced age being seized with it, after having been free from it all their lifetime. Some schirrous tumors will remain inactive for a long time, while others make a very rapid progress; and the virulence of the ensuing cancer is known by the acuteness of the pain, which, in some cases, is extremely sharp and lancinating, in others obscure and dull. Mr Wiseman says he has seen instances in which a phlegmon or erysipelas was conjoined with a cancer. One instance was of a woman who had a swelled gland in the breast, which lay dormant for some years, but afterwards swelled, and seemed to come to suppuration. At last, it appeared to be quite full of matter, though accompanied with many hard tubercles, and other symptoms of a cancer, when it burst, and discharged a great quantity of curdled matter; but, as she would not suffer the indurated parts to be removed, the cancer continued to increase, and in a short time put an end to her life. In another case, a woman was afflicted with a painful and hard swelling in one of the glands of her left breast, which was greatly exasperated by the imprudent use of cataplasms and plasters. In about six months it ulcerated, and spread into the axilla; the whole upper part of the arm becoming

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schirrous, while the under part became quite oedematous to the very ends of the fingers. The breast appeared fixed to the ribs, with an hard unequal swelling reaching to the clavicle and side of the neck, being suppurated in some parts, and cancerous in others.

The cure of cancers, excepting by extirpation, has been deemed, by the best modern practitioners, to be altogether impossible. Formerly, indeed, a number of remedies have been prescribed, such as stramonium, and other herbs of the poisonous narcotic kind. Saturnine ointments and plasters have also been recommended externally, along with the internal use of all the tribe of alterants, correctors, refrigerants, repellents, &c. Quacks have boldly and desperately ventured upon strong escharotics; but, though these have sometimes succeeded, it appears that those who prescribed them have been mistaken as to the nature of the disease which they undertook to cure; for many tumors of the scrophulous kind, as well as malignant ulcers, occasioned by a general bad habit of the system, have been mistaken for cancers. Some scrophulous tumors, when inflamed, become so hard and painful, that the mistake may be easily made by an inexperienced practitioner. But in this, as in all other cases of true inflammation, the increase of pain and hardness is always accompanied

nied by a proportionate degree of fever, which is never the case with a cancer ; for the excessive pain of a cancer may sometimes quicken the pulse, it never raises it, but the contrary. Another distinction between an inflamed tumor, whether of the scrophulous kind or not, and the cancer, is, that the skin of the former is always tense, smooth, and free from wrinkles ; while that of the cancer, as has already been mentioned, is strangely corrugated, and never discovers any kind of fluctuation below it, as is the case with suppurated tumors. The crooked and varicose veins may generally be taken as signs of a cancer, though neither these, nor the appearance of bloody sanies discharged from an ulcer, are altogether infallible. The most certain signs are, 1st, The great inequalities observed in the surface of the sore ; fungous flesh rising up in various places, and deep cavities, owing to the erosion of the flesh by the ichor, taking place in it. 2d, The very corrosive nature of the matter discharged from the ulcer itself ; which not only destroys the subjacent fleshy parts, but even abrades the skin from those in the neighbourhood which are sound. 3d, A vehement burning heat, which takes place over the whole surface of the ulcer, and which commonly torments the patient more than any other symptom
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of the disorder. 4th, The shooting and lancinating pains, which come on at intervals; very different from that continual and throbbing pain which accompanies a phlegmon or inflamed tumor of any kind. These pains, which are very severe in the cancer not yet ulcerated, become much worse after the skin is broken, and the ulcer formed.

There are two remedies which have been principally recommended in cancerous cases, viz. cicuta and arsenic; but, though the good effects of the former have been acknowledged in cases of indurated glands, yet the best practitioners declare, that, in confirmed cancers, they never saw it of the smallest benefit as to the accomplishment of a radical cure *. It has, however,

* Of late, the cicuta bath hath been made use of in cases of cancer, and sometimes appears to have been of service. Dr Hamilton mentions a case supposed at first to be venereal, but which afterwards turned out to be a true cancer. In consequence of the mistake concerning its nature, mercury had been exhibited with the very worst effect. The patient had been originally of a scrophulous habit, at least allied to those who were so, and from his infancy subject to a red cuticular eruption. The disease attacked the scrotum, where it produced an ulcer of an inch and a quarter in length on the right side, and in a longitudinal direction with the spermatic cord. The lips were hard, jagged, and but little elevated,

ever, been useful in alleviating pain, and producing matter of a better appearance and consistence

vated, the cutis vera was destroyed, when he came under Dr Hamilton's care, and the fore appeared of a red and fiery colour. In consequence of his supposing it to be venereal, mercury was exhibited both outwardly and inwardly ; and so easily was the patient affected with it, that a salivation was on the point of being produced very rapidly ; so that the exhibition of the mercury was frequently interrupted, and the decoctions of *sarsaparilla* and *mezeoreon* only continued, which had been given along with the mercurials from the beginning. Under this course the ulcer daily became worse, so that in ten days the spermatic cord was laid bare, notwithstanding the use of opium, hemlock, and carrot poultices, &c. In eight days more, the ulcer had passed across the root of the penis, and reached the left side of the scrotum, and in its passage consumed not only the skin and adipose membrane, but an inch of the corpora cavernosa ; the whole penis also becoming very much inflamed and turgid. Finding matters in this situation, the Doctor laid aside the use of mercury, and in its stead exhibited opium, extract. *cicut.* along with the bark ; but all to no purpose ; the destruction of the penis appearing to be certain, and even the life of the patient in the utmost danger. Recourse was now had to the *cicuta* bath, which was prepared in the following manner. Half a pound of the seeds of *cicuta vulgaris* were tied loosely in a bag, along with four large handfuls of the leaves and flowers ; after which they were boiled in a copper vessel in seven pailfuls (8 English gallons) of water, till the quantity was reduced

sistence than before. The effects of arsenic, when externally applied, are probably nothing else

reduced to fix. The whole was now put into a wooden trough, along with twelve pailfuls of cold water, and in this the patient continued immerfed to the arm-pits for the space of fifteen minutes. By the very first bathing the pain was lessened, and the progress of the ulcer stopped. The second not only diminished the discharge, but changed its appearance, so that, from being sanious and fetid, it became purulent. As the sore mended, the time of the patient's continuance in the bath was augmented to half an hour or more; and so rapidly did the cure now proceed, that in a month's time from the first use of the bath he was quite well. The Doctor remarks, that in this case the ulcer did not heal up like wounds or abscesses, with granulations of new flesh, but the sides of the ulcer contracted every day until they became contiguous, after which they united from the bottom upwards; the cicatrix thus assuming a pursed up and unsightly appearance.

Where the cancer is situated in such a manner that the bath cannot reach the part affected, Dr Hamilton recommends the application of the decoction by means of syringes. In the case of a cancer of the rectum, it was directed to be applied by means of a long flexible tube during the time the patient was in the bath, so that he might have the benefit of the medicine both internally and externally. Thus, the decoction may be conveyed into the vagina, or even into the uterus itself, or into the bladder, in all which parts of the body cancers most commonly, if not always, prove fatal.

else than those of a strong escharotic, with this additional misfortune, that, whether externally applied,

In the fourth volume of the Medical Observations, we have an account of a schirrous tumor in the right breast of a lady, which seems to have been more of the true carcinomatous nature than the foregoing. It had first made its appearance in the left breast, but dissolved after a continuance of some years. From this time she had pains in her right breast, for which sea-bathing and other remedies were tried in vain. A tumor was then perceived in the breast, which by degrees showed itself to be of a cancerous nature. At the time the cicuta was entered upon, the tumor extended about four inches in diameter, was hard, and fixed to the ribs ; the skin was of a deep purple colour, and corrugated, but no ulceration had taken place. She took the cicuta internally in such quantities as to affect her head, and the breast was fomented with a decoction of it ; but, notwithstanding this, and the use of other powerful remedies, an ulceration took place in the large tumor, and another schirrus, about the size of a pigeon's egg, appeared in the axilla. The extract of the cicuta, which she had hitherto taken, was then changed for the powder, but with no better success ; the ulcer continued to spread, and the sanious discharge was so intolerably fetid, that the smell of it seemed to the patient herself to be more grievous than all the pains she endured. This, however, was most effectually removed, by the application of a carrot poultice, though no stop was put by this, or by increased doses of the cicuta, to the spreading of the ulcer. Recourse was therefore had once more to the external use
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applied, or taken internally, in ever such small quantities, the continued use of it ever produces such a tendency to a general paralysis, that no lasting benefit can possibly be expected from such a remedy.

Of late, a new theory has been mentioned, viz. that the virus of the cancer was contained in the crooked veins which surround it, and from which, as has been said, it derives its name ; at least, that it is by means of these that the cancer spreads its corroding ichor through the neighbouring parts. Hence, say they, if the stagnant and corrupted blood contained in these veins be sucked out, the cancer cannot spread, and will soon exhaust itself. To accomplish this desirable purpose, therefore, they apply a number of leeches, who suck the poisonous blood, and die immediately after ; but the patient feels the happy effects of the evacuation, by being freed from such a deplorable disease. The good effects

of this medicine, and with great success. By injecting a strong decoction of the plant into the sore, continuing the use of the carrot poultice at the same time, the ulcer became, in a few days, quite clean and florid ; and the discharge, from being quite tough and viscid, so that it could not be got off without much difficulty and pain, assumed a proper colour and consistence ; and in six weeks from the application of the cicuta externally the size of the ulcer was lessened, from four inches in diameter, to less than the size of an almond.

effects of this remedy have not yet been determined by practice ; the theory is certainly wrong. The crooked veins which we can see are only superficial, and cannot communicate the whole or any part of the virus to the rest of the body. Though the blood, therefore, was sucked out from these, there would yet be a sufficient number to which we could have no access by leeches, or any other way, except incision, to communicate the infection to the whole body.

It being then determined that no other method of cure can be attempted, in cases of cancer, than a total excision of the diseased part, it remains only to be considered whether this can be done at all times, with any probability of success. And here, indeed, the matter seems to be easily brought to a decision. It has already been observed, that the cancer is a disease which may be communicated by absorption of the virus. As long as the tumor remains unconnected with the subjacent parts, therefore, there are great hopes that no absorption of matter has yet taken place that can be attended with any detriment ; but, after it has begun to adhere to the skin, and subjacent muscles, the probability becomes less, and, after it has been ulcerated for some time, the hope of effecting a radical cure must be extremely little. This theory has been so far confirmed by practice, that very eminent

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practitioners have given it as their opinion that no cancer ought to be extirpated after it has become ulcerated ; and I must confess that my own practice hath hitherto confirmed their opinion. I have always found that the excision of a confirmed cancer never removed the disease, except for a very short time ; and that, when it returned, it was always attended with more violent symptoms than before. As to palliatives in the case of ulcerated cancers, they consist of little else than opiates, to mitigate the pain, and a carrot poultice to abate the foetor. Both these intentions have in some cases been obtained by the use of cicuta ; which perhaps may be considered as having an anodyne quality ; but, in general, it is necessary to have recourse to opium. The external as well as internal use of cicuta has been recommended ; and, indeed, the sprinkling of the sore with the fine powder of the herb would seem to be as efficacious as the extract taken inwardly. Whether the very powerful antiseptic, called *nitrous air*, would be of any service in cancers, or whether it might not, by an acrid quality, exasperate the disease, is an experiment that has not yet been tried.

OF SCROPHULOUS TUMORS.

THESE, like the Schirri, principally affect the glands at first, and by means of them sometimes the other soft parts of the body producing ulcers of the most deplorable kind, in which the bones become carious, and over-run the body in such a manner as to reduce it almost to one general mass of corruption. These tumors always arise from a certain habit of body, which very frequently, if not always, exists from the time of birth. Those affected with this distemper are of a fair complexion, delicate, and weakly; and indeed, weakness of constitution, if not absolutely the cause, certainly tends greatly to augment the disease. Hence, every thing that tends to debilitate the body, such as cold, bad air, improper food, want of exercise, &c. will, in those naturally inclined to the distemper, produce more numerous and malignant tumors of the scrophulous kind than would have taken place in these persons, had they been otherwise treated.

External accidents cannot bring on a scrophulous disposition, but may be the immediate cause of producing tumors. Thus, Mr Wiseman gives an instance of a cook's servant, who happening
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to fall asleep upon a form, his neck was pressed, during the time he slept, upon the end of it; and, by the time he waked, was full of strumous tumours, of various shapes, some as large as a walnut. These were soon converted into ulcers, and, notwithstanding all the remedies that could be applied, he died in six months.

The mesenteric glands are very frequently affected with scrophulous obstructions and indurations; and indeed it is almost always the case that these glands are affected at the time that any scrophulous tumor appears on the outside of the body. The most common seat of these tumors, however, are the glands of the neck; though, when the disease is violent, they affect those of any other part, and will render the joints useless, eroding, and rendering the bones carious, and destroying the muscles, and their tendons. All the viscera are likewise apt to be infected; but it doth not appear that the brain is ever the direct seat of a scrophulous tumor; though, indeed, Wiseman mentions the case of a lady in whom the brain was found putrified, and the inner table of the skull carious, some years after a strumous tonsil had been extirpated. She suffered much, during this interval, by pains in her head, and died suddenly.

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Scrophulous tumors attack with little or no pain and inflammation ; they are more moveable than the schirri, and in most cases much softer. They are extremely apt to disappear in one part of the body, and to arise again in some other ; so that it is dangerous to use very powerful applications, as the disease might, by means of these, be translated to the lungs, and produce a fatal consumption, which has often been the case. They are brought to suppuration with great difficulty, and never discharge matter of a good quality. What comes from them, though less corrosive than the sanies of a cancer, yet is sufficient to consume all the soft parts, and even the bones through time ; as the sores very often continue for a long time, without showing any disposition to heal. Sometimes they will remain in a manner stationary for years, and at others make a rapid progress ; for which differences we cannot account. Unless the disease be very violent, they are not attended with much pain ; though some who died of the disease have been known to suffer extreme agony. The edges of the sores particularly are painful, and always much swelled.

With regard to the cure of scrophulous tumors, it is vain to expect a radical one, until the general constitution is rectified, which, in the scrophula, is generally very difficult, if not impossible.

possible. The only medicine which has hitherto been applied with success is the bark, which must be given in a very large quantity, or the patient will derive no benefit from it. Mineral waters, air, and exercise, with every other kind of tonic medicine, have also been found of service, but topical applications of very little use. Free vent ought always to be given to the matter; for, if it be confined within the tumor, it is apt to commit great ravages, as has already been mentioned. The most proper applications are those of the saturnine kind, as they resist inflammation, and prevent, in some degree, the spreading of the fore. When the bones become carious, we must have recourse to the methods already mentioned when treating of caries; but amputation cannot here be of any use, as the disease proceeds from a fault in the general system. It conduces very much to the cure, that the edges of the fore be gently compressed, and, after they are healed up, it may be proper to insert an issue; which ought to be continued as long as the patient lives. The scrophula very often attacks the eyes, producing a most obstinate ophthalmia, and even ulcerations, if not removed in time. In this case the bark is the only remedy.

*OF THE RICKETS, MOLLITIES OSSIUM, AND
SPINA VENTOSA.*

By the Rickets we mean a preternatural softness of the bones, chiefly of the legs, in children, by which means, becoming unable to sustain the weight of the body, the limbs bend, and are distorted throughout life. The disease generally shows itself at first by an increased size of the belly, probably owing to an obstruction in the mesenteric glands. This is followed by obstructions in the liver, spleen, and pancreas, after which the head gradually enlarges in size, a difficulty of breathing comes on, the sternum elevates itself, and forms an angle, the spine protrudes in various parts, and the bones alter their shape in different places of the body; the extremities of the ribs first become enlarged, then the sternum, and afterwards all the bones of the body become soft and flexible, and, yielding to the impulse of the strongest muscles, bend in various ways, deforming and distorting the whole body. On dissecting the bodies of children who die of this disorder, we find not only the bones rendered preternaturally soft, but the vessels which penetrate their substance quite full of blood, the texture of which is entirely dissolved,

solved, so that it resembles chocolate rather than blood. In many places the periosteum is separated from the bone, the intervening space being filled with a fluid; the muscles of the whole body likewise appearing pale and flabby in such persons.

As the rickets proceed from some general debility of the system, we cannot expect any thing from topical applications. To keep the limbs straight, indeed, certain mechanical contrivances will be necessary, of which we shall afterwards treat particularly, when we come to speak of distorted limbs. In some cases, mercurial medicines may be of use; but generally tonics, such as the bark, cold bath, gentle exercise, and the use of mineral waters, are proper.

The mollities ossium seems to be a disease different from the rickets, as in this the solid parts of the bone are entirely dissolved. The disease is rare, and the cause is not well known. The most remarkable instance of this distemper was that of Madam Supiot, a Frenchwoman. In the year 1747 she had a fall, which occasioned her to keep her bed for some time, and left great pain and weakness in her loins, and lower extremities. In about a year and a half afterwards, she began to perceive her left leg particularly affected. Along with this weakness she had violent pains over her whole body, which
increased

increased after a miscarriage, and still more after a natural delivery, in the year 1751. She was now seized with startings, great inquietude, and such violent heats, that she was almost continually in a sweat, and could not bear the least covering, even in the coldest weather, and while her pains continually increased, she took notice that her urine precipitated a white sediment. Her pains abated on the appearance of the sediment, but she now observed that her limbs began to bend, and from this time the softness of them instantly increased till her death. In the month of April 1752, the trunk of the body did not exceed 23 inches in length; the thorax exceedingly ill formed, and the bones of the upper part very much distorted; those of the lower part were very much bent, and the thigh-bones became so pliable, that her feet might easily be laid on each side of her head. The right side did not, till after some time, become so deformed as the left; but it was surprising to observe the alterations which daily took place, and the different figures assumed by the limbs, in consequence of the increased softness of the bones; so that when the sediment in the urine was considerable, the disease of the bones seemed to be at a stand, increasing considerably when it was suppressed. Besides this, she had violent pains, startings, difficulty of

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breathing,

breathing, spitting of blood, and lastly a fever, with convulsions. She died in the beginning of November 1752, and, on dissecting her body, the following appearances were observed. 1. The muscles in general were of a very soft and pale consistence, the vastus externus, fascialis, quadriceps, biceps, and external parts of the gracilis, were much shorter than in their natural state, and more firm and tense; while those on the opposite side were much elongated, thin, and very tender; in short, the whole muscular system had suffered more or less, according to the action of the muscles in her lifetime. 2. The bones were entirely dissolved, the periosteum remaining unhurt, so that they exhibited only the form of a cylinder. 3. The heart and large blood-vessels, both veins and arteries, contained large black polypi, of a viscid consistence, and very unlike those usually found in dead bodies.

A case of softness of the bones is related by Mr Gough, but considerably different from the above, as it was attended with a remarkable fragility of the bones before they became soft. It likewise began with pains through the whole body, attended with feverish symptoms; but, after some weeks, they became confined chiefly to the legs and thighs, though they were not increased by pressure.

pressure. This fragility of the bones does not appear to have been the case with Madam Supiot. In the month of June 1749, she broke her leg in walking from her bed to a chair, and heard the bones snap. No callus, however, formed though the fracture was instantly reduced, and treated by one of the best surgeons in that part of the country ; but, instead of this, the bones began to grow flexible, and, in a few months, were so from the knee to the ankle. The disease still continued to increase, so that, in a short time, the other leg and thigh were affected in the same manner, after which both legs and thighs became oedematous, liable to excoriations, and to discharge a thin yellow ichor. Scorbutic symptoms began to appear in the winter after her leg was broken, and her gums began to bleed. Tonic medicines were exhibited without any success, only that her menstruation became more regular, and her appetite and digestion better than before ; but, towards the end of her life, her breathing became difficult, the spine distorted, and a pain in the loins took place upon every motion of the vertebrae ; and, as her limbs were now quite useless, she was obliged to sit upright in bed. At last, the ends of the bones on which she sat having become also very soft, spread much, and the ends of her fingers and thumbs, by frequent endeavours to raise

raise herself, became also very broad, and the phalanges crooked. The flexibility of the bones gradually increased, and became more general, attended with a wasting of the flesh, and excessive difficulty of breathing. The menstrual flux totally ceased four months before her death; her legs, which were very anasarious, and excoriated almost all over, became erysipelatous, but she retained her senses to the last. She expired, suddenly, having talked in a composed manner concerning her miserable situation and approaching end only a few moments before.

On examining the body, she was found to have lost two feet two inches of her natural stature. The heart and lungs appeared sound, but had been much confined, principally by the liver, which was enlarged to an extraordinary degree; it was not, however, schirrous, or any other way diseased. The spleen was very small, and the mesentery had one large schirrous gland. All the bones, except the teeth, were softened, so that scarce any of them could resist the knife; but those of the lower extremities were the most dissolved, being changed into a kind of paranchymous substance, like soft dark coloured liver, without any offensive smell. So completely indeed were they decomposed, that the knife met with less resistance in cutting through them than in sound muscular flesh, though some bony lamellae

lamellae were here and there to be met with, but as thin as an egg-shell. The most compact bones, and those which contained the greatest quantity of marrow, were the most dissolved; and it was observable that the dissolution began internally, as if the marrow had been the occasion of it; for the bony laminae remained here and there on the outside, and nowhere else; the same thing seemed also to be shown by the pain not increasing upon external pressure, when the disease first commenced. The periosteum was rather thicker than ordinary, and the cartilages thinner, but not in a state of dissolution.

Some chemical experiments were made upon the bones of this woman, but nothing could by that means be discovered. The dissolved bones yielded a great quantity of oily matter, and a little earth. No cause could be assigned for this disease in the case we speak of; and indeed, in that of Madam Supiot, the cause which was assigned, viz. that of her eating too great a quantity of salt, seems to be totally inadequate. Other instances of this extraordinary softness of the bones might be mentioned, all of which proved fatal, so that hitherto no cure seems to have been discovered for it.

Another disease, which likewise begins in the internal part of the bone, most probably in the marrow, is called *Spina Ventosa*. This disorder, though

though so deeply seated, may be the consequence of an injury done to some of the medullary vessels which pass through the bone, and thence not unfrequently ensues, after a severe blow, or other hurt on some of the limbs ; or it may likewise take place in consequence of a general bad habit of the body. The complaint begins with a dull heavy pain, deeply seated, though the limb appears outwardly quite sound, and not the least injury seems to have been done to the bone. Children are particularly subject to this complaint, especially such as are of a bad habit of body. They will often complain of one of their limbs being remarkably heavy, and become lame. The pain is not very acute, but rather a constant, dull, and throbbing uneasiness ; and, if rigors are superadded to this complaint, it may be accounted pretty certain that matter is formed in the cavity of the bone. The disorder, however, is too frequently neglected, through the ignorance of parents and nurses ; the uneasiness the young ones complain of being accounted only *growing pains* ; nor is their attention awaked till the extremities of the bones begin to enlarge, or perhaps till it swells throughout its whole extent. Sometimes, however, the disease goes on without much pain till the bone is quite corroded, and the matter arrives at the periosteum, when a tumor resembling

ling a deep seated abscess, is produced. Violent pain then takes place, the soft parts become inflamed, and have a kind of emphysematous feel; part of the matter retiring, upon pressure, into the cavity of the bone, whence probably the disease has got the name of *Spina Ventosa*.

When a bone is thus affected in its internal part, there can be no hopes of a cure, but by the entire separation of a large part of it, which has been frequently known to take place, and the deficiency repaired by the powers of nature in a very wonderful manner. The cure in general must be attempted by tonic medicines, to strengthen the constitution where it is diseased; and sometimes the application of a triphine to the lower part of the tibia, where the disease is seated in that bone, has been found of very considerable use. Amputation ought not to be thought of until every other method has been found ineffectual.

Akin to the *Spina Ventosa* is that most excruciating, and too often incurable disease, called a White Swelling. The seat of it, however, is very different; the *Spina Ventosa* being a disease of the cavity of the bone, the White Swelling of the ligaments of the joint.

WHITE SWELLINGS

HAVE, by the medical writers, been divided into two kinds, viz. the *rheumatic*, called also the *most simple*, and the *scrophulous*. The former has its name from the places which it attacks, and which are the same with those usually attacked by the rheumatism, viz. the larger joints, the knee, ankle, and elbow; while the latter affects indiscriminately every joint, whether great or small, not even those of the smallest fingers and toes being exempted from its depredations; though, in both kinds, the knee seems to be that against which its malignity seems principally to be directed.

In those cases where the knee joint is affected by rheumatic white swelling, the attack begins with an acute pain, sometimes on one side, and sometimes on the other, but has never been known to affect the whole joint at first. This pain, though at all times severe, is greatly increased by warmth, so that during the night-time it is almost intolerable; and, even from the beginning, some degree of swelling may be observed, if the joint is viewed with attention. During the progress of the disease all the symptoms are exasperated; and, to an increase of the
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pain and swelling, a considerable degree of tension is superadded. Every attempt to stretch out the limb, or to move the joint, is now attended with such an increase of pain, that the patient is fond to keep it always in a relaxed posture, without any attempts at motion; and hence an absolute immobility and rigidity of the tendons soon takes place. If, during this stage of the disease, proper remedies are not applied with success, the swelling is augmented to such a degree as to surround the whole joint, and thus it appears very considerably enlarged in bulk. This appearance, however, is somewhat fallacious; for, as the limb generally wastes both above and below the affected joint, the latter seems to be larger than it really is. In many cases, the pressure of the tumor upon the neighbouring parts causes the limb to become oedematous, and the cutaneous veins swell, as in cancers, becoming not unfrequently varicose. At this time also, the joint has a kind of elastic feel, extremely different from that of confined matter. The pain is increased to the utmost extremity; and, as formerly, is much the worse when the patient is in bed, or otherwise warmed. Frequently it is so extremely violent, that the unhappy patient is deprived, not only of rest, but of his appetite also; and thus the general health of the system is considerably impaired. Other cau-

ses also contribute to produce this effect. The whole tumor has a kind of fluctuation, but extremely different from that of an ordinary abscess. It does not pit in any degree, nor change its colour, when pressed by the fingers. Nevertheless, true abscesses break out in many places, which, when opened either naturally or artificially, discharge matter of an encouraging appearance at first, but soon degenerating into a thin and fetid kind of sanies. The ulcers produced by these openings are very apt to heal up; but, when they do so in one place, they break out in another, so that at last the capsular ligament comes to be affected, and the cavity of the joint itself is penetrated. When this happens to be the case, the ligaments soon yield to the acrimony of the matter with which they are continually in contact, the bones become carious, and the inflammation of the ligaments becoming excessive, the pain is augmented to the utmost extremity, without any intermission day or night, and in proportion to the space occupied by the disease the pain is felt.

By this tormenting pain, the want of sleep, and particularly the absorption of the sanies into the system, the health is at last entirely destroyed; hectic symptoms, viz. diarrhoea, night-sweats, &c. take place, and death at last closes the miserable scene.

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The rheumatic white swelling seldom attacks before the age of puberty, but the scrophulous kind comes on at any time of life. Its attack is made with less violence than that of the former ; beginning with a slight sensation of fulness in some part of the joint, attended with an uncommon sensation of heat ; and, as the patient does not feel much pain, the disease is too commonly neglected until the symptoms become greatly aggravated. As the disease increases, the pain becomes fixed, and very acute ; but remains confined to a small space, though the swelling of the joint increases greatly. The same difficulty of moving the limb, without an intolerable increase of the pain, takes place in this as in the rheumatic kind ; and, in consequence of this, the same rigidity of the tendons, and total immobility of the joint, at last take place. From the beginning of the disease there is a considerable degree of tension, with an evident enlargement of the whole joint, which has given rise to a mistaken notion of practitioners, that the scrophulous white swelling is always attended with an enlargement of the bones.

In this kind of white swelling, as well as in the former, the tumor has an elastic feel, and collections of matter are likewise formed in different places. The adjacent parts assume a livid colour, and the abscesses run in various directions. If artificial openings are made, the mat-
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ter appears sometimes of a good quality, but in small quantity, and soon degenerates into a brown sanies; or, if in large quantity, assumes this appearance from the beginning. Most commonly, however, it has an appearance like the white of an egg. Some of the orifices heal up, but others remain open; and from some of them small pieces of carious bone are discharged. In general, when probed with caution, the instrument will be found to pass into the cavity of the joint in various places; and, when the disease has been of long standing, some parts of the bone will almost always be found carious.

The scrophulous white swelling seems to affect the health of the patient much less than the other, at least if it makes its attack before the age of puberty. I have known instances in young subjects, where, for three years together, there have been sinuses running into the cavity of the joint, attended with a discharge of very fetid matter, evidently from the corroded cartilages and extremities of the bones; and yet, in this situation, the pulse has continued almost natural, the appetite good, the belly regular, and the sleep but little disturbed. In adults, however, the disease terminates almost in the same manner with the former, producing the same hectic symptoms from the absorption of the matter. A copious and gross expectoration, quick pulse, night sweats, particularly affecting the head,

head, breast, and superior extremities; diarrhoea, attended with acute pain about the umbilicus before every evacuation; a copious sediment of purulent matter in the urine after standing for about six hours; and thus the patient, becoming daily more and more emaciated, death at last puts an end to his miserable life.

The symptoms attending white swellings are so extremely violent, and the disease itself so remarkably obstinate, that the attention of practitioners has been particularly directed to the appearances of the limbs affected with it; many of which have, for this purpose, been dissected. The accounts are various. Dr Monro says, that the appearances are similar to those of *Spina Ventosa*; and gives an instance of a patient whose leg was amputated in the Royal Infirmary, in the year 1734. “When the diseased joint (says he) was dissected, all the cellular membranes in which fat is naturally contained, under the skin, between the muscles and tendons, and upon the ligaments, were found full of a glairy matter, which had insinuated itself every where, and made the other parts so soft, that we could scarce distinguish one from another. In several places of this glairy substance, there were small cavities full of pus. When the articulation of the knee was opened, all the mucous glands, and fatty membranes, were seen in the same condition with the exterior parts; the
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femilunar cartilages themselves, between the tibia and femur, being quite soft, and with the same cellular mucous appearance that the glands had. We also observed some pus within the cavity of the joint ; but the extremities of the bones were scarce begun to be eroded.” Other writers have observed, that sometimes there is no other morbid appearance besides the thickening of the ligaments. In these the bones and cartilages are not at all affected, and the synovia also remains in a sound state. According to these writers also, the thickening of the ligaments is not any primary or essential symptom of the disease, keeping pace neither with the continuance nor violence of the distemper. It is commonly greater when the abscesses make their appearance than otherwise ; and indeed the matter above mentioned seems to proceed from the thickened ligaments. Collections of pus being frequently met with among this matter, as well as small hydatides, mixed with it.

In the scrophulous white swelling, it has been supposed that there is an affection of the bones, much more than of the soft parts ; insomuch that, even in the slightest cases, there is an evident enlargement of the ends of them, or of the epiphyses attached to them, sometimes on one side, and sometimes on both. Where the disease has been very inveterate, the spongy parts of the
bones

bones have been found dissolved into a thin fetid sanies; and that, even where the cartilages are not greatly affected; though indeed these are also sometimes dissolved, and the whole substance of flesh, bones, &c. dissolved into one fleshy pulpy mass. In almost all the joints of this kind which I have examined, the ligaments were uniformly much thickened, and the interstices betwixt the different layers of the aponeurosis, and particularly the bursae mucosae, were either filled with purulent matter, or distended with the gelatinous substance above mentioned. The capsular ligament, as well as many parts of the cartilages which cover the ends of the bones, were destroyed in many places, and the bones themselves carious. In any of those limbs which I have dissected, however, I never had the mortification to observe the joint perfectly sound, though, for seven years that I lived in the Royal Infirmary, I was particularly careful in examining every one which was amputated there; and, for ten years since I left it, was equally solicitous to inspect every one amputated in it, when I happened to be present at the operation, or where I had occasion to amputate any limbs in my private practice. Had it been otherwise; had I ever had the misfortune to observe, either in my practice, or that of any other, the capsular ligament entire, the cartilages perfectly

fectly found, and the synovia of a proper quality, and in sufficient quantity, I must certainly have concluded that the advisers of such an operation had erred, and that, by proper applications, the limb might have been saved, though at the time the patient had been afflicted with excessive pain, and even experienced a considerable degree of rigidity in the tendons.

The white swelling, however dangerous and obstinate, in many cases admits of a cure. An antiphlogistic regimen is proper in the rheumatic kind. Cooling purges, such as Sal de Rochel, Crem. Tart. Infus. Tamarind. cum Sena, may be given with success, when repeated at proper intervals. Some blood may also be taken from the diseased limb, either by means of leeches or cupping with scarification; though the latter is always to be preferred where it can be used. Little advantage, however, can be expected from either, unless the quantity taken away be considerable. Ten or twelve ounces ought to be taken at a time, and the operation repeated at proper intervals, till the pain goes off entirely; and, by attending to the directions formerly given upon that subject, it will be an easy matter to obtain the quantity of blood just mentioned. If leeches are used, the number ought to be considerable, and we cannot expect a sufficient discharge from fewer than sixteen or twenty.

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In the first stage of the disease, almost all our hopes of cure rest upon performing this operation with judgment; but, even when the pain has abated considerably, which it often does, we frequently find a great degree of swelling and tension remaining, so that the completion of the cure must not be left to nature, otherwise all the bad symptoms would be apt to return on the least exertion of the patient. Rubefacients and blisters will now be found of the greatest use. Blisters may be put upon each side of the patella, and ought to be of such a size and shape as to cover the whole of the swelling on the inside from the hinder part of the joint at the edge of the hollow of the thigh, to the edge of the patella, over the whole extent of the swelling above and below. As soon as the blister is taken off from one side, it ought to be applied to the other, and thus repeated alternately, until both swelling and pain be completely removed. When this is the case, the patient ought to be directed to rub the joint well with a liniment composed of half an ounce of camphor dissolved in two ounces of oil, with the addition of half an ounce of Spir. Sal. Ammon. Caustic. or, as it is now called, Aqua Ammonia. This is to be used three times a-day; and in this way I have successfully treated many cases of white swelling, in two or three of which there was an evi-

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dent appearance of a very large collection of fluid on each side of the patella. The patients still continue well, though the cures were performed several years ago.

In April 1790, W. G. a porter, aged 52, VI. happened, when carrying a considerable load, to fall and bruise his left knee on the inside. For some days he felt but little pain; but afterwards, in walking down to Leith, the whole joint became suddenly affected with a very acute pain, which increased every moment, and in the course of a few weeks was attended with a very considerable swelling, which also continued to increase, until the joint at last became rigid, the pain all the time seeming to pass immediately thro' the centre of the joint. In this situation he continued for nearly twelve months, when I was called to him. I found his knee-joint very much swelled, and had an elastic feel, complaining of constant severe pain, which was exceedingly aggravated during the night, and he could neither bend nor extend it in the smallest degree; but, notwithstanding the long time the disease had continued, there was no evident fluctuation. He had frequently applied leeches, and had fomented the joint with flannel wrung out of warm water; and these applications had been continued for a long time without any change,
either

either in the pain or swelling. I ordered him to put a blister over the whole joint, and, after it was removed, to put a cataplasm of bread and milk upon the place till it should heal ; and, as soon as one blister was healed, I desired him to put on another in the same manner. By this treatment the pain and swelling were entirely removed in three months, and at the time of writing this he is able to follow his employment, though more than sixteen months since the cure was performed.

G. B. A strong and healthy man, about VI.
thirty-six years of age, a currier by trade,
was, one night in the month of December 1788,
after a severe day's labour, seized, while in bed,
with a pain in the joint of his left elbow, which
at times affected also the joint of the wrist. For
several days he made a shift to follow his business,
though with a considerable degree of pain,
but in a short time was obliged to desist, on account
of the violent pain in his elbow, which was always
greatly exasperated in the night-time when in bed.
The pain in the wrist was but slight. There was
little or no appearance of swelling for some time ;
and, even during the first four weeks, the pain
(which seemed to be confined to the centre of the
joint) was often so violent that it made him cry out,
particularly in the

the night-time, yet the swelling was but trifling, but the motion of the joint was destroyed by the violence of it, and rigidity of the tendons. In this miserable state he continued till the month of March 1789, having, during all that time, consulted no medical person, but attempted to relieve himself, by the advice of his neighbours, by the application of leeches, spirit of wine and camphor, strong ardent spirits, neats-foot oil, and putting upon the pained joint the warm omentum of a sheep newly killed, but without any relief.

On the 10th of March 1789 I first saw him, and found the joint greatly swelled, with an elastic feel, but no perceptible fluctuation. He complained of most exquisite pain upon every attempt to bend the joint, but in other respects his health was good. I directed him to have recourse once more to the leeches, but to put on twenty, instead of six, at once, and to encourage the flux of blood by immersing the joint in a large basin of warm water, as hot as he could bear it, and to be renewed as often as it should cool. Next morning I ordered him a mercurial purge of three grains of calomel rubbed with fifteen grains of cream of tartar. After the bleeding was stopped, the arm was ordered to be well wrapped up in flannel.

March

March 12th, The wounds from the leeches had discharged a great quantity of blood, and the laxative had operated well. For the two last nights the pain seemed to be somewhat easier, but without any change in the appearance or feel of the joint. Twelve leeches were ordered to be applied this night, and one grain of calomel made into a pill to be taken every night at bed-time.

15th, The wounds from the leeches had bled freely; the pain, he thought, was somewhat abated, but the swelling continued much as at first. The medicines were continued, and a blister applied to the inside of the arm, in such a manner as completely to cover the one-half of it. As the pill had purged him this day four times, with gripings, two grains of opium were ordered at night, to be continued till the next visit.

19th, The blister had risen well, and made a copious discharge, but was now almost whole; he had no looseness nor gripes, and had rested better for these two last nights than he had done for two months before. During most of that time he had been obliged to sit up in a chair throughout the night, but two nights ago had slept four hours at a time in bed. His calomel and opium were continued, and a blister applied
to

to the outside of the arm so exactly as to cover the other half of it.

24th, Thinks the pain still diminishing, and has slept in general four hours every night since last report; but frequently waked with such intolerable shooting pains as to make him leap out of bed. The inside of the arm was now so well as to admit of the application of another blister, which was accordingly laid on at night. The gums were now somewhat spongy, and his breath a little tainted; for which reason the calomel pill was ordered to be taken only every second night. The opium was continued.

29th, The pain seemed to be still less severe, and the swelling now began to diminish; the blisters were completely healed. Another was applied on the joint from the one side to the other, extending three inches above, and three below it. The opium and calomel were continued as before.

April 5th, The violence of the pain is greatly abated, but he still finds himself unable to bend the joint in the smallest degree. As his mouth was sore the calomel was omitted, but the opium continued, with the addition of half a grain. A blister was this night ordered to the back part of the joint, of a magnitude sufficient to cover the whole of it, in the same manner as had been done on the fore part.

12th,

12th, The pain still decreasing, and the swelling very sensibly diminished. The blister on the fore part ordered to be repeated. His mouth still affected; ordered to be washed with fig-tea. Belly regular.

18th, Swelling greatly abated; pain severe only at times; and he thinks he can move the joint a little without increasing it; his mouth less affected. The opium continued, and a blister applied behind as formerly. As his belly was costive, six drams of Rochel salt were ordered to be taken in a cupful of weak tea in the morning.

26th, The swelling almost completely gone, but still complains at times of shooting pains, as he says, in the body of the joint. A long blister ordered sufficient to surround the joint; the opium continued with the calomel every two nights.

May 8th, The swelling appears to be completely gone; but still there were frequent returns of the shooting pain, particularly at night. Continue the opium and calomel. The arm to be well rubbed morning and evening with two ounces of oil, and half an ounce of caustic spirit of sal ammoniac; and, at night, a stripe of flannel to be applied round it.

16th, The pains less frequent; but, as his mouth was affected, the use of the calomel was
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interrupted, but the opium and use of the liniment continued.

24th, His mouth quite well, the pain in a great measure gone; every thing omitted but the liniment.

June 10th, The shooting pain seldom or ever felt, but he can move the arm very little. I ordered him to take a pound weight in his hand, and swing it gently backwards and forwards twice a day, and once in eight days to add another to it if the pain did not return. In four weeks I saw him again, and he was then using four pounds, had no return of the pain, and had used no application to the arm. I desired him not to increase the weight for some weeks. In two months from that time he called upon me, and informed me that he had had no return of the pain, but had not entirely recovered the use of his arm, which indeed is still the case, though he has never had any return of his complaint.

These two cases shew the efficacy of the method of cure; but, where the means above directed fail, recourse may be had to the mercurial friction, of the efficacy of which I shall give an instance, where, by a gentle salivation kept up for three weeks, every symptom of white swelling diminished, and in eight weeks from
his

his first using the mercury the cure was completed ; nothing remaining but a stiffness in the joint, which indeed in all cases is the last symptom of the disease that is removed. This indeed is frequently very difficult to be cured, and continues in a great degree after every other symptom has disappeared. This stiffness obviously arises from no other cause than the great contraction which takes place in the muscles, as well flexors as extensors, from the total incapacity of the patient to use them. No collection of matter is ever formed in the cavity of the joint within the capsular ligament, and consequently no abrasion of the cartilages or bony concretion can be the cause ; indeed every day's experience shows that nothing of this kind ever takes place. Neither is there any reason to suppose, as some have done, that it arises from thickened synovia. The disease is entirely muscular, as is evident from its yielding to remedies which can only be thought to act upon the muscles. Thus the relaxing power of warm water has been found of great service. Fomentations with flannel wrung out of boiling water may be applied to the leg and thigh three times a-day, at the same time, that the parts may be well rubbed with any emollient, as warm oil olive, hog's lard, &c. along with which I have frequently used electricity with great success, when

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every thing else had been tried in vain, even by practitioners much older and better than myself.

The best method of using electricity is by drawing sparks from the muscles, throughout their whole course, from their origin to their insertion, and this continued every day for half an hour. Having persevered in this for eight or ten days, gentle strokes should be given through the whole length of the thigh, placing one of the balls on the origin, and the other on the insertion of the muscle, thus making the muscle a part of the circle ; by which means, in a very short time, the patient will recover the use of his limb completely.

Mrs S——, aged 28, who had all her VIII.
lifetime enjoyed a good state of health, excepting that, about four years before her present attack, she had had a rheumatic fever, which, however, was completely cured at that time, in the month of April 1783, four weeks after delivery, was seized with an ephemer-
ra. This went off by a copious perspiration, induced by taking some warm fluid, so that in twenty-four hours she appeared to be quite well, excepting only a slight pain in the joint of the right knee, affecting the outside, and to which no attention was paid for some days. At last it suddenly spread over the whole fore part of the joint,
which

which in a few days more swelled considerably. Having for some time been attended by the late Dr Spens, man-midwife, I did not see her till June 23d. I found the knee greatly swelled round the whole anterior part of the joint, with an almost intolerable pain, and the leg drawn up and wasted; so that she had not been able to lay herself down in bed for eight days past; pulse 108; appetite much impaired; belly costive; the swelling did not indicate its containing any matter by its fluctuation, but had an elastic feel. Round the whole joint the skin appeared to be very tense and red.

Hitherto she had continued to suckle her child, but it was now given out to nurse. Six ounces of blood were taken away by scarification, and the joint fomented for an hour with flannel wrung out of boiling water, as hot as she could bear it; the same to be repeated early in the morning; besides which she had a draught with 30 drops Tinct. Thebaic. and 25 Vin. Antimonial, after a laxative injection had been given at night.

24th, Injection operated twice, has slept little, but thinks the pain less severe. The scarificator was again applied to the fore and under part of the knee, and six ounces more of blood taken away. The fomentations were continued every fourth hour, and at bed-time the draught repeated, with five drops more of laudanum.

25th,

25th, Pulse as yesterday, about 100, the pain considerably relieved, particularly on the fore part of the joint ; but still finds it impossible to lie down ; has slept an hour and a half last night. Continue fomentation and draught.

26th, Pain much as yesterday ; slept little through the night ; swelling somewhat diminished. A blister this night applied to the whole inside of the joint. A cupful of Arabic emulsion, with two drachms of nitre to two pounds of the liquor, to be given every two hours.

28th, Blister still discharging copiously ; pain much abated, though still she cannot lie down for it. Draught and emulsion continued ; belly rather costive. Ordered an infusion of tamarinds with senna.

30th, Blister almost whole ; pain so much abated, that she was able this night to lie down for two hours ; physic had operated four times, which gave relief. A blister ordered to the outside of the joint ; the laudanum increased to 40 drops, and the antimonial wine to 30.

July 4th, Blister well risen, pain much relieved ; slept several hours in an horizontal posture. Continue draught, and apply another blister to the inside.

By following this course for three months from the time I first saw her, excepting only that a more generous diet was allowed as her appetite

tite increased, and pains diminished, all her complaints were removed, only the stiffness of the joint remaining; and this also yielded to the constant use of electricity for four weeks. Two years ago I saw her in good health, and she was then the mother of three more children.

Mr G——, aged 24, who had all his IX.
lifetime enjoyed an uninterrupted state of health, after a very fatiguing walk in March 1788, complained of a pain in his right knee-joint, which daily increased, and, in six weeks from the first attack, put on completely the appearance of a rheumatic white swelling. The gentleman, being a student of medicine, began to be very seriously alarmed on finding it to increase after the second week, and from that time treated his complaint according to the most exact rules of art. Topical blood-letting, fomentations, cooling purgatives, &c. were used in vain, and the advice and directions of several eminent practitioners were given without effect, and among those who attended him was the late celebrated Dr Cullen. Finding, at last, that the disease was not to be got the better of in the ordinary way, and determined to submit to anything rather than lose his leg, he resolved, contrary to the advice of all his medical friends, to go into the country. Soon after his arrival there

there he began to complain of pain and burning heat about his anus, with a constant discharge, which increased for several days, and the cause was discovered by his surgeon to be a number of venereal fici. A gentle mercurial course was now begun, notwithstanding the debilitated state in which he was, by reason of want of sleep, pain, &c. which was continued till his mouth began to be affected. The affection of his knee now began, for the first time, to yield to medicine; and the mercury being cautiously persisted in for near three months, every symptom of venereal affection, as well as of rheumatic white swelling, was entirely removed. Since that time, he has often declared to me, that, till the above mentioned affection of his anus attacked him, he verily believed himself invulnerable in this way, viz. that he could not be affected with the venereal disease in the ordinary mode.

Suppurations seldom or ever take place in the true rheumatic white swelling. But it is in this disease, as in every aponeurotic inflammation, such as of the eye, testicle, &c. where great pain and tension take place, that, if proper medicines are not speedily and diligently applied to alleviate these symptoms, the joint will undoubtedly be lost by suppuration, as we too frequently see the eyes and testicles are. This may happen,
and

and only can happen, from allowing the inflammation to run too high, and continue to do so too long, without paying proper attention to the antiphlogistic regimen. Should suppuration, however, take place, the matter, as soon as it is observed to be formed, ought to be discharged by means of a seton, as has been observed in the chapter where the opening of abscesses is treated of, and where the seton is preferred to every other method.

Should the discharge of this matter be too long neglected, it is evident that it may as readily penetrate into the cavity of the joint as outward ; and, if so, this must at last occasion the loss of the patient's limb. By making an opening with a lancet, or otherwise, the air would of necessity be admitted, the matter, of consequence, rendered more acrid, and the ligament of the joint more apt to be destroyed. But, by using the seton, the patient will not suffer much, and the surgeon will have the testimony of his own conscience that he has done every thing in his power to save the limb. Yet, after all, if the disease increases much, and hectic symptoms come on, the patient's life can only be saved by immediate amputation ; and I am assured, from repeated experience, that at any time a limb may be amputated with success. Instead, therefore, of waiting till the patient is almost exhaust-

ed with diarrhoea, and other hectic symptoms, it should be done on the very first appearance of them. Of this I am certain, having operated with success on more than 40 patients afflicted with this disease. That amputation may be performed at any time with safety, is likewise evident, from the example of sailors and soldiers wounded in battles. How many of these recover where there is a necessity of taking off the limbs immediately after the wound has been received? During the time of the last war, I heard of twenty amputations being performed aboard one vessel, and of these patients only one died; and this, as appears to me, rather from the loss of blood before and during the time of the operation, than from any other cause; for the amputation was performed so high that the tourniquet could not be applied with success.

In the serophulous white swelling the same kind of treatment may in some measure be followed with success, particularly bleeding with leeches. Saturnine applications may afterwards be laid on the swelled joints, and changed every morning and evening. The patient may now and then be gently purged with any saline laxative. The following is the best formula I have met with :

℞ Sal de Rochel
 Tart. Solub. *aa.* ℥iv.
 Sal Polychrest
 Marin. Hispan. *aa.* ℥ij.
 Solve in Aq. Bullient. ℥iiij. dein adde
 Aq. Cinnamom. ℥viij. *M.* Sign.

Two table spoonfuls of this solution to be mixed with four gills of water, and a gill drunk every 15 minutes till the four are finished. This medicine is to be given early in the morning, and repeated every second or third day.

Great suppurations frequently take place in the scrophulous white swelling, which are yet capable of being cured. In many cases, particularly when the elbow joint was affected, the suppuration has been known to go to such an excess as to render the bones carious, splinters of which have been discharged through the orifices, while sinuses have passed directly into the cavity of the joint; yet, by keeping clean the ulcers, and dressing them simply with basilicon, or Turner's cerate, they have healed up; and, in four or five instances, the joint has at last recovered its motion.

On the 15th of December 1772, I visited X.
 Jn. B. a girl of 15, the joint of whose right
 arm was remarkably affected by a scrophulous

B b

white

white swelling. There were six openings which discharged a serous matter, two or three of them penetrating into the cavity of the joint. Several pieces had been discharged from the head of the ulna, through an opening now almost healed up. Round the joint also were many cicatrices of old ulcers, and three still open. The disease began about four years ago with a small swelling on the outside of the arm, at the joint, which swelling continued to increase till the whole joint was involved in it. Her principal complaint at first was a burning heat throughout the swelling, which also spread across the joint as the swelling went along. The skin over the swelled place put on a red and shining appearance, which likewise increased as the swelling did; so that, in six months from the first attack of the disease, the whole joint was affected; and, on the place where it first appeared, the skin broke, and an ulcer was formed, discharging a thin serous matter mixed with a kind of caseous substance; but, though several openings of this kind were formed along the course of the swelling, she never complained of any great pain; and her general health was good, without the least symptom of fever. The joint had been frequently blistered before the openings took place, and saturnine remedies applied to it. In three months time all the openings were healed up except two, and

and the swelling now daily diminished. The fores were dressed with pledgets spread with basilicon, and every night, at bed-time, wrapped round with two or three folds of flannel, moistened with a strong solution of sugar of lead. She has not yet menstruated, though frequently affected with the symptoms which precede that flow ; and I have been informed by her mother, that, as these increase, the discharge diminishes.

I have seen cases of a similar kind, where the knee joint was affected, though, in some instances, a stiffness of the joint has remained after the ulcers were completely healed up. In patients not yet arrived at the age of puberty, therefore, I would advise a delay of the operation as long as possible, with the use of sea-bathing, and other remedies proper in the scrophula. I recommend this the more strongly, having seen several cases where the amputation was advised by very eminent practitioners as the only thing capable of saving the childrens lives, who have yet recovered without it, as at that time the parents could not be brought to submit their children to such a dreadful operation. After the age of twenty-five, however, matters have a different aspect. At this time of life it seldom affects any large joint, but in consequence of an accident ; so that every method already mentioned in the
cure

cure of scrophula should be tried as expeditiously as possible ; and, when these fail, recourse should be instantly had to amputation. If this is delayed, very dangerous symptoms may come on from the destruction of the ligaments, and ends of the bones, which cannot but terminate in the death of the patient.

CHAP. VII.

OF HERNIAE.

By an hernia is understood the descent or protrusion of some of the abdominal viscera out of their place, so as to produce an evident and preternatural swelling in the abdomen itself, or in some of the adjacent parts, greater or smaller, according to the quantity of the viscera which have been forced out of their natural cavity.

The viscera which commonly descend, or are protruded in the manner just mentioned, are the intestines and the omentum ; and when the former are the cause of the tumor it is called an *enterocele*, when the latter, an *epiplocele* ; or, when both do so, it is called an *entero-epiplocele*. Sometimes, even the bladder will change its
place

place in this manner, but the disease is much rarer than the two former. It is called *cystocele*.

The hernia, likewise, takes a different name, according to the particular part in which the tumor makes its appearance. When it appears in the groin, it is called an *hernia inguinalis*, or *bubonocèle*; in the hollow of the thigh, *hernia cruralis*; at the navel, or along the linea alba, *exomphalos*, and in the scrotum, *oscheocèle*; and, in any other part of the belly, *hernia ventralis*. In women, the tumor frequently takes place in the *labia pudendi*, and is called hernia of the labium pudendi.

The size of the tumors must be in proportion to the quantity of the viscera which fill them; and this is exceedingly various, according to the habit of the patient, and the cause producing the disease. In Morgagni, we read of cases of *oscheocèle*, in which the hernial tumor was only about the size of one of the testicles; and one of those being dissected after death, it was found to be occasioned by a portion of the omentum. This patient, during his lifetime, had been supposed to have three testicles; and our author is of opinion, that other cases which have been related by physicians, of men having three testicles, were no other than such as had small hernias of this kind. We are not, however,

however, to imagine that the danger arising from an hernia, is in proportion to its size; for we have instances of herniæ, not exceeding the size of a walnut, or so small as scarcely to be perceived by the patient himself, proving mortal in a short time, and that even without any mortification having taken place *. On the other hand, we have

* A remarkable case of this kind fell under my own observation not long ago. John Bannerman, a man of 54 years of age, was, about noon, on the 24th day of March 1791, seized with severe gripes about the navel, attended with a sense of contraction in the abdominal muscles, which soon brought on sickness, nausea, and vomiting. Having formerly laboured under similar complaints, arising from an inguinal hernia, he laid himself down on bed, with a view to reduce the protruded intestine. On examining his groin, however, he could discover no more fulness in it, at that time, than he had felt at others; a little fulness being always discoverable there, ever since the first hernial descent, which happened more than ten years before. Till now, he had been always able to reduce his hernia, by lying on his back, and firmly and gently pushing up the parts; but, at this time, finding no increase of the swelling, nor any pain at the ring, he did not believe that the symptoms under which he now laboured were to be attributed to the same cause, though, in every other respect, entirely similar to the former. On this account, he delayed to call in any medical assistance, but attempted to relieve himself by taking an ounce of Glauber's salt. These, however, he instantly vomited, and the vomiting having continued

have heard of herniæ of vast magnitude being sustained for a long time by the patient, before death

continued and increased, along with a very severe pain; I was at last called. At my first visit, March 25th, I found him in great agony, vomiting every thing he took, and the discharges attended with a fæculent smell; his belly was considerably swelled; his extremities cold and moist, the pulse scarcely to be felt; and he had great thirst, with a constant hiccup. Being informed that he had been formerly subject to an hernia, I immediately began to examine his groin; but he was positive that his complaints could not originate from that cause, as the swelling was scarce to be perceived, or at any rate, no bigger than usual, and at no time exceeded the size of a large Turkey bean. On examination, however, I was clearly of opinion, that the swelling, though extremely small, (not exceeding an inch, or an inch and a half in length), did indeed contain a part of the bowel protruded, and completely strangulated in the ring; and this I told both him and his friends, though none of them thought proper to pay any regard to my words. I insisted, that the only chance he had of life, was by the operation; but neither the patient himself, nor those about him, would hear of this; vehemently asserting that his complaints could not arise from the cause I imagined. Finding that, during the night, he had got two injections from the people of the house, both of which had operated, I could do nothing more than give another, with 80 drops of Laudanum; but this was productive of no good effect; every symptom continued to increase, and the patient died at ten o'clock at night, exactly thirty-three hours from the first attack.

death was brought on ; nay, sometimes of pretty large ones being borne without much inconvenience. Medical writers give us an account of large portions of intestine, to the length of several yards, descending into the scrotum, and even of almost the whole contents of the abdomen being protruded at once. Hence it is evident, that there cannot be any rule for determining what parts of the abdominal viscera are usually to be met with in herniæ, unless we take the bulk of them into consideration, as well as other circumstances. As the *intestinum ileum* is nearer than others to the passages through which the viscera descend, it is natural to suppose that it will be most commonly found in the smaller herniæ ; and indeed, in four cases of hernia, in which I performed the operation, it was this intestine only which had protruded *. Others mention the *cæcum*, or *appendix vermiformis*, with the part of the colon,

* On opening the body of John Bannerman above mentioned, I found two inches of the *ileum* protruded, and quite empty of every kind of alimentary matter. The gut was of a dark colour, and the thickenss of its coats evidently increased considerably. On examining its situation with regard to the ring, I found that the latter acted as a tight ligature upon it, in such a manner as to prevent the alimentary matter from descending, as well as the venous blood from ascending. On opening the ring itself, by cut-

lon, as making part or the whole of the contents ; and indeed, when the herniæ are very large, there is no doubt, but that not only these, but much more of the intestinal tube, will be protruded. Hence, along with the cæcum, colon, and ileum, we sometimes find the jejunum also. It may seem difficult to
account

ting it cautiously, and carrying the incision up to the left side of the umbilicus, by which the gut, both above and below the stricture, was clearly exposed to view. I found that the part of the intestine without the ring was swelled to three times the size of that contained within the ring ; and that all the bowels above the constricted part were greatly distended with flatus, and of a dark red colour, but without any appearance of mortification. The protruded gut did not adhere to the sac in any part ; and, on being lifted up, it had the appearance of having been tied tight with a cord by the edge of the mesentery, without including the smallest portion of it within the ligature. That part of the gut which had been contained within the substance of the ring now expanded itself, and appeared to regain its natural size, which it did most completely by forcing the contents of the upper parts of the guts through it towards the colon. The size and dark colour of that part which had been confined now appeared to be owing, in a great measure, to the accumulation of blood in the veins, which instantly emptied themselves on being laid open ; and on pressing out the blood, and washing that part of the gut in water, the coats of it were reduced to nearly their natural thickness ; nor was there in any part the smallest appearance of gangrene.

account for this descent, as the mesentery is designed to keep the intestines in their proper places; but this being a membranous substance, is capable of great elongation, and will thus suffer them to descend for a very considerable way, when acted upon by their own gravity, and the pressure of the abdominal muscles.

The excessive quantity of abdominal viscera sometimes protruded in herniæ, has given rise to an opinion, that, in cases of large herniæ, at least, the peritonæum was not only dilated but lacerated; and this opinion seemed to be confirmed by some cases, in which the intestines have been found in contact with the testicle. From this opinion, the disease has taken the general name of *rupture*, though more accurate observations have shown that this is almost always ill-founded. It appears from the universal testimony of the most expert anatomists, who have dissected herniæ, even of the largest size, that they never found the peritonæum ruptured, but only very much dilated. There is no doubt, indeed, that in some cases the peritonæum may have been destroyed by an ulcer or gangrene; in which case, no doubt, the intestines would then be protruded through the opening. Of this we have a case from Tacconus; but, in another hernia, much larger in size than the former,

former, the colon and mesocolon, which were the intestines protruded, were all surrounded by the peritonæum. The same has been observed in the most enormous herniæ, described by medical authors, which hung down to the knees, or beyond them, and even to the calves of the legs. The case is the same with an exomphalos or hernia of the navel; for in this the protruded intestines have been found inclosed in a sac, even when the tumor has equalled or exceeded the size of the head. So far, indeed, is it from being ruptured in cases of this kind, that, in an exomphalos, where the tumor was upwards of a foot in diameter, it was found greatly thickened, difficult to be cut through, and resembling the external skin in consistence. This observation was made by Hottinger; and Dr Haller likewise informs us, that, in cases of exomphalos, as well as of other herniæ, he had found the peritonæum only dilated.

It is in the crural herniæ principally that the rupture of the peritonæum is said to have happened. But, though it cannot be denied that some cases might have been observed where there was such a rupture, yet they are so extremely rare, that, from them the disease could not, with any kind of propriety, have been so called. When herniæ are attended with ruptures of the peritonæum, they are generally
known

known to have proceeded from external violence; in which case the intestine has suddenly been protruded, and the tumor at once enlarged itself extremely; though even, when these signs occur, it has not always been found that a rupture of the peritonæum has taken place. The appearance of the intestine in contact with the testicle may be explained on the supposition of an *hernia congenita*; that is, where the intestine has descended along with the testicle before birth.

The sac in which the hernia is inclosed always consists of a portion of the peritonæum, protruded, or pushed before the intestine in its passage out of the cavity of the abdomen. In the *hernia congenita*, the sac consists of the tunica vaginalis of the testicle, which is a duplicature of the peritonæum, and perfectly similar to an hernial sac. For some time before birth, about the eighth month of pregnancy, when the testicle descends into the scrotum, it must push before it a portion of the peritonæum, exactly in the same manner that the intestine does that which lies before it, while passing out to form an hernia. Now, in the case of the descent of the testicle, it is evident that, while it descends, more or less of the intestine may descend along with it, in proportion to the acting causes. In such cases the infant will
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be born with a rupture, which is called *hernia congenita*, and in which the intestine must be in contact with the testicle.

The passage by which the testicle descends into the scrotum is soon shut up; and thus all communication between the cavity of the tunica vaginalis and that of the abdomen is cut off; so that no hernia, similar to that of newborn infants, can ever take place in the adult, unless it has continued from infancy. But, though no hernia of this kind can take place, one of a different kind may. The peritonæum is generally much weaker at the place where the orifice of the tunica vaginalis was than elsewhere; and which place is known by a kind of cicatrix, somewhat similar to that which appears within the abdomen opposite to the navel. This weak place is besides opposite to the opening of the tendon of the external oblique muscle, which is not defended either by the obliquus internus or transversalis. Hence, as by our erect posture, the intestines press more upon the bottom than any other part of the belly, and, as in the performance of many natural functions, they are likewise pressed with very considerable force, it is natural to think that, in certain cases, where the acting force has been very great, the weaker part must give way, and an hernia be formed.

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The very same effect must be produced wherever there is any considerable weakness in the integuments of the abdomen, or where the peritonæum is only defended by a tendinous aponeurosis, or expansion, or by cellular substance. Hence the crural hernia is produced by the descent of the intestines under the arch of Poupart's ligament, through which the large blood-vessels of the thigh pass, and which are surrounded by a considerable quantity of cellular substance. This kind of hernia is more frequent in women than in men, on account of the size of the pelvis in the former. The exomphalos proceeds from the want of firmness in that place, compared with what is met with in the rest of the tendinous expansion. The ventral herniæ may be formed in any part of the belly, by the intestines insinuating themselves between the interstices of the abdominal muscles, or by a weakness in some of the muscles more than the rest. In this case the tumor subsides upon pressure, and returns as soon as it is taken off.

The hernial sac, when first protruded, is of the same thickness with the rest of the peritonæum, and makes a more considerable resistance to dilatation at the first protrusion, than it ever does afterwards. Hence the hernia is never so large at its first appearance as it is some time after. By degrees, however, it enlarges,
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the passage becomes larger, as well as the peritonæum more dilatable; so that though, in such herniæ as are not of the congenial kind, the tumor seldom descends at first lower than the groin, yet, after a number of descents, it will get quite down into the scrotum. During these repeated descents of the intestine, it is remarkable that the hernial sac, instead of becoming thinner, always grows thicker, and that apparently without any limitation; so that in such as have been very long subject to herniæ, the thickness of the sac has been found not less than half an inch or more. It is not certainly known whether the hernial sac, after being once protruded, ever returns again into the cavity of the abdomen. It may possibly do so in the state of infancy while it is very thin; but, as the sac begins to thicken, it evidently acquires also a strong tendency to adhere to the adjacent parts; and therefore, in such as have been dissected, the hernial sac has always been found firmly adhering to the tunica communis. This is a matter of some importance, and shall be more fully considered afterwards.

From what has been said concerning the manner in which herniæ are produced, the causes producing them must be evident. These are, in general, any thing by which the action of the abdominal muscles is violently exerted upon the
intestines,

intestines, or the intestines violently impelled against them. Hence, in children especially, herniæ may be produced by violent fits of crying, coughing, &c.; in adults by violent exertions, as straining to lift heavy weights, &c. These operate by exciting a violent pressure upon the intestines, by the strong contraction of the abdominal muscles and diaphragm in such operations. Jumping sometimes will produce herniæ, by the violent impulse of the intestines upon the abdominal integuments when the person alights, as well as by the efforts of the muscles themselves when he sets off. Falls will also produce them, for a similar reason.

All these must be considered as the *external* causes of herniæ; but, besides these, there is one *internal* cause, which perhaps contributes more frequently than is supposed to the production of the disease; and without which, none of those above mentioned would have been able to produce it, unless applied in a manner uncommonly violent. This is a morbid laxity of the system, either naturally or accidentally produced. It may proceed from sprains, which affect one particular part, or it may arise from a general affection of the system, from diet or other causes. Thus, the use of oil in those countries where it is plentiful, and made an article of diet, is found to subject those to herniæ who
accustom

accustom themselves to it. The like may be said of all kinds of weakening diet in general, as well as all those causes which induce an universal debility of the system. It is very probable also that a sedentary life may dispose to the production of *herniæ*, as well as too violent exercise; since the former, by producing a preternatural laxity, renders the weaker parts of the integuments unable to resist the weight of the intestines; while the latter, by inducing too violent a pressure upon them, forces the intestines out through those parts, which would otherwise be sufficiently strong to retain them. It has been observed that people who live in convents are very subject to *herniæ*; which, though commonly ascribed to the immoderate use of oil in their food, may perhaps, with equal reason, be attributed to their excessive indolence and too frequently a voluptuous kind of life. *Herniæ*, for similar reasons, are common in fat people; for these are naturally more inactive than such as are less disposed to corpulency; their body is of a more lax texture; and thus the weight of the omentum, loaded with fat, sometimes to the thickness of four fingers breadth, presses upon the abdominal rings with such force, as in time to work itself a passage, and produce an *hernia*. In like manner, old people, especially after recovering from sickness,

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ness, are very subject to this distemper, owing to the relaxed state of their fibres at the time.

The symptoms attending herniæ are more or less violent according to the nature of the viscus which descends, and especially to the degree of strangulation which it undergoes in the passage through the ring. An epiplocele is undoubtedly the least dangerous of any ; because the omentum is much less essential to life than some of the other contents of the abdomen. Yet, when the pressure upon it is sufficiently violent to obstruct the circulation, there is undoubtedly a very great degree of hazard, as a mortification is to be expected in the part thus cut off, as it were, from the rest, which could not fail of being attended with symptoms as fatal as in any other part of the body. It is this stricture indeed which creates the danger, and not the mere descent of the bowels ; for there are many instances of large portions of intestine lying for a long time in the hernial sac, and performing their functions in a proper manner, until by some unlucky circumstance a strangulation has taken place, and all the dangerous symptoms of inflammation have ensued. These may indeed be brought on when only a part of the omentum has descended ; but much more are they to be apprehended in a descent of the intestine itself ; and, when a large portion of the omentum descends,

scends, it is scarce to be expected but some portion of the other viscera will be brought down along with it ; or, at any rate, as long as the passage continues open, through which the omentum descended, there is reason to fear a subsequent descent of the gut ; so that an epiplocele is by no means to be disregarded as if it were a matter of little consequence.

The danger attending an enterocele, as has already been observed, proceeds from the obstruction produced in consequence of a stricture made on the intestine in that place through which it descends, and may be brought on by various causes. As soon as the pressure upon the intestine in the ring becomes considerable, the swelling, which takes place by the stoppage of the circulation, augments the disease and its cause. Thus the intestines being unable to propel their contents, they accumulate along the canal ; and the stomach being affected by sympathy, an inclination to vomit is produced, together with excessive pain in the place where the obstruction is, and particularly about the umbilicus. At first a bilious matter is brought up ; but at last, as the passage downwards is entirely shut up, the peristaltic motion becomes inverted, and the contents of the intestines are discharged by the mouth. The pain continues to be excruciating in the highest degree for a long time,
attended

attended with obstinate costiveness, which indeed has been mentioned as a predisposing cause of the disease, until at last a tendency to mortification comes on, both without and within the ring. The pulse then sinks, a violent thirst comes on, the parts protruded become emphysematous, and more and more distended, as well above as below. The extremities become cold, constantly attended with a clammy sweat, though the patient himself is never sensible of this coldness, owing to the deficiency of circulation which occasions the gangrene. The swelling at last subsides so much as scarcely to be sensible, and, the ring losing its tension, the intestine is frequently reduced spontaneously; the pain abates, and the tension of the belly, if any tension had taken place, subsides; the vomiting ceases, but is succeeded by an hiccup, which, though little noticed by the attendants, is a speedy forerunner of death, which sometimes comes unexpectedly, when it was thought that the patient was getting the better of all his complaints. In short, the patient dies with every symptom of mortification, as in the ileus when it ends fatally.

In this manner are all patients affected where the contents of the herniæ have been much compressed, or become gangrenous by a stricture or strangulation, as it is called, in the passage through which they descend. Only, it must be observed,

observed, that, where the omentum alone descends, the violent symptoms occasioned by a strangulated intestine cannot occur, though even here the patient may suffer greatly from sickness, vomiting, and pains through the whole belly; but if death ensues, it must always be in consequence of a mortification, from the circulation being stopped. It is therefore of consequence to discover when the disease first comes on, whether it be occasioned by a descent of the omentum, or of any of the other contents of the abdomen; and to do this it will be of use to attend to the following signs.

1. When the omentum only descends, the tumor feels soft and flabby, yielding to the fingers like dough, without that elasticity perceptible in those cases where the intestine is concerned. If the tumor is in the scrotum, it may be even distinguished by the shape, which in the omental hernia is more oblong than in the intestinal one; or it may be even distinguished by its weight, where the quantity is large.

2. When a portion of intestine descends by itself, or along with the omentum a pain is felt, not only in the tumor itself, but, over the whole abdomen, there are reachings to vomit, a continual nausea and costiveness; but if the portion of intestine be small, it is more difficult to distinguish it by the feel than in other cases. It
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doth not appear that the symptoms of an intestinal hernia are in any degree milder, when accompanied by a descent of the omentum, than in any other case, though this has sometimes been supposed.

3. When the tumor is formed by a part of the intestine alone, it will be small in proportion to the quantity of intestine which forms it; but, whether small or large, it has a much greater degree of tension, and which is very perceptible to the touch, than where the omentum alone is concerned, especially if there is any considerable degree of stricture upon it, in which case the gut becomes inflated with wind, as well as inflamed. The tumor is also very painful when handled, and the pain is increased by coughing, sneezing, or any other effort. If the tumor be in the scrotum, it is more round than in the omental kind, by reason of the inflation of the intestine, which makes it assume a spherical form. But, where there is no considerable stricture, the tension will be but small, whatever the size of the tumor may be; nor will it be painful in handling; though, upon the patient's making an effort by coughing, it will give a sensation as if wind were blown into it.

Some glandular swellings have been confounded with herniæ, both scrotal and inguinal, though,
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in general, it is no difficult matter to distinguish them. Thus we may easily distinguish a venereal bubo from an hernia, not only by the absence of the sickness, vomiting, &c. which attend the former, but likewise by the extreme hardness of such swellings at their first appearance, and the fluctuation of matter when they arrive at a state of suppuration. The sarcocoele, or hernia humoralis of the testicles, may be known by the exquisitely painful sensation with which the handling of the tumor is attended, as well as by the enlarged state of the testicle itself. In this disease also the intestines are not affected, nor are there any of the general symptoms of hernia formerly mentioned. In all cases of hydrocele also, except where the swelling is enormously great, the spermatic cord is easily distinguishable; but in hernia it is quite the reverse; for, in all cases of this disease, it is impossible to distinguish any part of it. Hence, in that species of hydrocele in which the spermatic cord itself is affected, the distinction betwixt that disease and hernia becomes much more difficult; particularly, when the swelling begins at the upper part of the cord, even within the ring of the abdominal muscles. In this case, indeed, we cannot certainly determine by the feel whether it be an hydrocele or a true hernia; though, in general, we have a sufficient-
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ly distinguishing characteristic in the swelling beginning in the under part, and proceeding upwards. In all cases, however, the absence of the true hernial symptoms must be sufficient to distinguish the one from the other ; for none of these attend any species of hydrocele whatever ; though it is not altogether impossible that such a combination of these symptoms may take place, along with an hydrocele of this kind, as to deceive even the most skilful practitioners.

It has already been observed, that some very large herniæ have been sustained for a number of years without any inconvenience ; such as these, by an adhesion of the prolapsed parts to the sac, and of the sac to the common integuments, become totally irreducible, and therefore can admit of no other cure than proper suspensory bandages or trusses. But, though these may lie dormant for a very considerable time, there is always great danger of their being some time or other attended with all the bad symptoms above described. The particular causes by which these are brought on are not known ; but, in general, we must suppose that they act by inflaming the intestine, and thus swelling it and producing a strangulation. The most experienced practitioners are indeed of opinion that all the bad symptoms of hernia are to be derived from this strangulation, which

takes place in the ring of the abdominal muscle ; though it is disputed whether the disease originates in the gut itself, or in the ring ; that is, whether the strangulation takes place in consequence of an affection of the ring itself, or whether the intestine first becomes inflamed, and afterwards strangulated. A very strong argument against this last supposition, however, is, that if the disease originated by an inflammation of the intestine itself, the reduction would not be attended by a relief of the symptoms ; because those of an inflamed intestine would still remain, which we know they do not ; but that the reduction of the protruded intestine instantly sets the patient at ease, though labouring under the most excruciating torture before. Inflammations of the intestines, indeed, are attended with symptoms very much resembling those of strangulated herniæ ; but these never cease instantaneously, as the symptoms occasioned by herniæ almost always do. In cases of old ruptures, however, it certainly does happen that an inflammation of the intestine takes place ; and it seems very difficult, on any other supposition, to account for the symptoms ceasing at one time, and taking place at another, without any alteration in the position of the protruded part of the gut. But, in other cases, where the operation has been performed,

the intestine has often been found perfectly free from inflammation; and even in those where a mortification has taken place, and the patient died, the intestine has been found quite free of any morbid affection.

A singularity in herniæ, not easily to be accounted for, is the sudden descent of the intestine, which frequently happens when the patient is in the most unfavourable position for such an accident; viz. lying in bed. In such cases, the intestine is pushed through the opening of the ring with great force, so that the patient is unable to keep it back with his hands; and this will frequently happen after fatigue, though no descent was produced by it at the time. It seems worth inquiring, whether this disposition be not owing to some spasmodic affection of the abdominal muscles, which might be removed by an anodyne.

It is by no means easy to make a prognostic in cases of herniæ, even with regard to the degree of immediate danger in which the patient is. Sometimes the most violent symptoms have continued for many days successively, without bringing on any mortification, or even inflammation, and the patient has been relieved with or without the operation; in other cases, a fatal mortification has taken place in forty-eight, nay, in twenty-four hours, after the first attack.

attack. The danger of this unfortunate event is pretty much in proportion to the strength of the patient; for the stronger and more plethoric he is, the more readily must the intestine inflame, and consequently mortify, if relief be not speedily obtained. Very old people are less liable to inflammation, but they are not exempt from it; and the infirmities of old age render such a circumstance very dangerous to them. In recent cases only, it is where we are to expect a perfect cure; where the disease has been of long standing, there is very little hope of the patient ever getting the better of the disease; though even this is not absolutely impossible. One case I was certainly informed of, in which a man of fifty-four years of age was perfectly cured of a rupture under which he had laboured for many years. The intestine descended indeed only occasionally; but, when it did so, the descent was almost always attended with symptoms of strangulation, and he sometimes suffered very severely before it could be reduced. At last the passage, by which the intestine descended, seemed gradually to become narrower; in consequence of which the fits became more and more severe, and the reduction more difficult, until, after an exceedingly severe one, the disease left him entirely; and, during the remainder of his life, which was
twenty-five.

twenty-five years, he never had any return of it in the smallest degree. In this case, however, the intestine was always reduced before it had time to form any adhesion to the hernial sac; but, when these have been formed, and the intestine becomes irreducible, it is in vain to propose any effectual remedy. People affected in this manner ought always to consider themselves as in a state of danger, and to be very cautious how they give themselves any violent exercise, or expose the tumor to any hard pressure, as by either of these causes an inflammation may readily be produced. In general, however, such herniæ as have but newly come on are more liable to be attended with violent and even fatal symptoms than old ones; and it is somewhat remarkable, that the smaller the portion of intestine is which descends, the more violent are the symptoms, and the more quickly do they advance. It is observable, however, that even old herniæ of the omental kind, which for some time have been irreducible, may afterwards become reducible by long abstinence and severe evacuations; though this must always be accounted a dangerous experiment, and which may possibly destroy the health of the patient entirely.

The cure of herniæ naturally divides itself into two parts; 1st, The temporary relief of such
urgent

urgent symptoms as threaten immediately the life of the patient ; and, 2d, Preventing, by proper means, the return of these symptoms.

1. To relieve the urgency of those symptoms which accompany a strangulated hernia, the only proper methods are, either to procure the reduction of the intestine through the opening by which it descended, or to divide the tendon of the muscle, through which it cannot be returned. This last is called the *operation*, and is not to be attempted till every method of reduction has been tried in vain. The manner in which the reduction has been attempted differs according to the nature of the herniæ. In a scrotal hernia, the patient ought to be laid on his back, with his breech and shoulders both raised, so that the sternum and pubes may approach considerably nearer to each other than in a natural situation. The surgeon then is to grasp the tumor in the middle, and to press the intestine up towards and through the opening of the ring ; but this pressure ought by no means to be violent at this time. If, therefore, this is found insufficient, we must have recourse to other means. The first, and indeed perhaps the most efficacious of these is blood-letting. The reason of its proving so efficacious is, that the strangulation is kept up and increased by the stagnation of the blood in the intestines, to
which

which a much greater proportion of that fluid is carried, than to any other parts of the body of equal bulk. By diminishing the general quantity, therefore, there will be a diminution of the quantity of blood carried to the intestines, greater in proportion than in any other part of the body. Hence the swelled and obstructed parts of the intestine, which cannot in that state return through the ring, on account of their bulk, will subside, and that possibly so much, that the reduction may be easily accomplished after the operation, which could by no means have been done before it. On this principle, it is plain that the quantity taken away ought to be very considerable; and indeed there is no disease, in which the taking away large quantities of blood is so proper, even from those who would otherwise be apt to sink under the evacuation. In cases of herniæ, it is frequently proper to bleed the patient till a *deliquium animi* comes on; by which means the spasmodic contraction of the abdominal muscles formerly mentioned as the probable cause of the descent of herniæ, is removed in the most effectual manner. This affection of the muscles of the abdomen is not indeed spoken of by medical or surgical writers; but, in a number of instances, to be afterwards related, the descent of the intestine has taken place when the patient was lying in bed, and
where

where, by reason of the horizontal posture, the gravity of the intestines could have no effect. In some of these cases, the bowels were pressed downwards with such force, that neither the patient's hand, nor even a bandage, could keep them from doing so. We must therefore have recourse to a spasmodic affection of the muscles, there being no assignable cause for such a symptom. The good effect of bleeding *ad animi deliquium* are also upon this principle more easily explained than on any other; for, though the removal of obstruction, by diminishing the quantity of the general mass of blood, must undoubtedly be of service, yet it can scarce be supposed that this cause could have such an instantaneous effect as very large blood-letting is frequently observed to have; for we must remember, that, if a spasmodic affection of the abdominal muscles is the original cause of the descent of the bowels, the very same cause must also prevent them from getting back to their former places. Now, there is nothing which more frequently relieves spasms than blood-letting; and though, in nervous diseases, the temporary relief it gives is much more than compensated by the mischief it occasions afterwards; yet, in cases of herniæ, these bad effects are not to be feared; and there have been instances

instances of an hernia being instantly reduced immediately after a large evacuation of blood.

After the patient has been blooded, it will be proper to lay him down on his back in the same position as before, and again to attempt the reduction in the manner already directed by pressure upwards. Only now the scrotum must be firmly grasped, the pressure kept steady on the scrotum, and gradually increased, moving the parts at the ring very constantly, and with a good deal of force between the thumb, fore and middle fingers of your right hand. This will frequently be attended with success; but, should it not, another remedy is next to be applied.

It is observed, that all those who are affected with herniæ are likewise habitually costive, or at least subject to frequent costiveness. In consequence of this, there must be a very considerable accumulation of feces in the colon, the evacuation of which must immediately be attempted, if no relief be obtained by bleeding, or the former endeavours to relieve the patient. In this attempt, it is plain that we can scarce expect any good effect from cathartics taken by the mouth. On the contrary, it is most evident that they must be hurtful, by increasing the nausea, sickness, and vomiting, as well as the pain about the umbilicus. The only remedies then upon which we can depend are injections; for, as the

passage through the small intestines is in a great measure shut up, by reason of the pressure of the ring of the external oblique muscle, if the colon is also stuffed with hardened fæces, there will be no possibility of the contents of the small intestines being protruded into it, which might otherwise be the case, if the colon was thoroughly emptied, as it would then operate by a kind of suction downwards, provided the strangulation was not entirely complete, though the power of the superior part must at any rate be extremely small. As to the quality of the injections, I have always found those to succeed best which are the least irritating. Fumes of tobacco have indeed been highly recommended : and I have no doubt but that at times they have been found serviceable, both as a purgative and an anodyne. From my own observations, however, I can affirm, that, in hundreds of instances, the use of tobacco smoke has proved altogether ineffectual ; nor has it even been of any use in cases of obstinate costiveness. In short, in all the instances in which I had an opportunity of seeing it tried, during my residence for seven years in the Royal Infirmary, and in a vast many others in my own practice, I never observed it to have any purgative effect, nor even to produce a single stool. The only and never failing effect which it had upon those patients who were obstinately

costive was to produce extreme sickness, and not unfrequently vomiting, which I have known to continue for an hour or two before the patient recovered ; and so severe was the sickness occasioned by it, that I seldom or ever could get the same patient to allow me to attempt it more than once. As to its anodyne properties, I can say nothing ; but its inefficacy in promoting the first intention was to me a sufficient reason for abandoning it, as well as its augmenting the alarming symptoms of sickness, nausea, and vomiting. A much more agreeable as well as effectual remedy, I have always found to be an injection of a solution of Castile soap, in the proportion of one drachm and an half to a pound of water. This I have injected in the quantity of from one to five pounds, and generally found it very effectual in evacuating, not only the colon, but probably also those parts of the small intestines which lie betwixt the caput cæcum and the constriction. By the use of this I never failed in any one case to evacuate the colon, though, in several instances, I have failed, after all, in reducing the gut.

The method of giving this injection is very simple. You must provide a large brass syringe, such as represented in Plate 3. fig. 1. capable of containing a pound, and furnished with a stop-cock and two pipes. Having previously fitted a piece
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of fine sponge, of considerable thickness, to one of the pipes, you are to introduce it, pressing the sponge against the anus, by means of the circular brass plate at the end of the pipe next the syringe. The other pipe, which is nearer to the syringe, is then to be introduced into a basin containing the injection, of which you ought never to have less than five or six pounds prepared. The former pipe being introduced into the anus, as already directed, upwards, and a little backwards, having previously anointed it with a little butter or hog's-lard, and keeping the second pipe in the injection liquor, turn your stop-cock, pull the piston of the syringe to the top, turn the stop-cock again, by which you open the passage directly into the gut; push back now the piston, in order to throw in the injection gently at first; and, if you meet with any resistance, move the syringe gently in the direction of the spine, throw in the quantity, and proceed in the same manner till the colon is completely filled. This you will know by the patient's complaining of a great sense of fulness, and some degree of pain at the caput coli. You must now cease your attempts to inject any more liquor, but do not remove the pipe. On the contrary, you must, if necessary, press the sponge a little more firmly to the anus, as the latter will by this time begin to lose its contractile power, and the
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use of the sponge is to supply this. In this situation you must remain ten minutes or more, unless the patient complain particularly of a very strong desire to go to stool, and then the syringe and pipe is to be withdrawn, and the patient set up, in order to favour as much as possible the discharge, which, in some cases I have been witness to, was almost incredible.

Having thus emptied the colon, which in the way above directed may be done without increasing any of the bad symptoms, we are next to apply to opiates, which, in this disease, I think are necessary; and in many cases I have found them of the greatest service in allaying the pain, and removing the sickness and nausea with which the patient is tormented. As the stomach, however, is always so much affected, that there can be but little hope of their being retained when given by the mouth, there is a necessity for exhibiting them by way of injection. In this, as in other cases, the dose must be proportioned to the age and strength of the patient. I never gave less to an adult than an hundred and fifty drops of laudanum, in four ounces of mucilage of gum Arabic, or if gum Arabic was not at hand, an equal quantity of boiled starch of a proper consistence. The laudanum being dropped into this liquid, and injected, I usually waited two hours to allow it to have its proper effect;
after

after which, if any pain, sickness, or vomiting remained, I exhibited another glyster with one hundred drops of laudanum; during all this time using also fomentations to the whole abdomen, as well as to the ring and hernial tumor.

Before I say any thing of the efficacy of general warm bathing, or warm poultices applied particularly to the tumor, it will be necessary, first, to observe, that I have hitherto considered the ring of the external oblique muscle as consisting of a tendinous expansion, void of any contractile power, and consequently acting upon the protruded parts as an inorganic cord, not easily to be affected by those causes which affect the muscular parts. It is indeed dilatable to a very considerable degree, as is demonstrable by the experience of every day, from the great size to which it may be, and always is, dilated by repeated attacks of hernia. It has, however, no great power of contraction; so that the strangulation must originally be brought on by the quantity of intestine and mesentery, or other parts protruded, being so great, that a constriction is made, in consequence of which an accumulation of blood begins to take place exactly in the same manner, and for the same reason, that an accumulation of blood takes place in an arm when tied up. We must likewise observe, that, in this disease, the contents of the intestines are frequently accumulated in the hernial

nial tumor, in very considerable quantity, by the vermicular motion, or muscular force of the whole superior part of the alimentary tube. Hence the compression of the intestine by the ring, which must thus be insensibly increasing, will at last put a stop, at least, in a great measure, to the muscular motion of that part of the tube which was protruded, as not being able to force out as great a quantity of its contents as are forced into it. Thus the symptoms of strangulation are constantly increasing; until, at last, not only the circulation, both in veins and arteries, is completely stopped, but the passage of the contents of the small intestines is totally obstructed. Hence a mortification of the protruded part of the intestine must necessarily ensue, and the patient dies with the same symptoms as in the case of ileus.

Things being thus circumstanced, as I hope the cases to be afterwards adduced will clearly evince, that any partial application of warm poultices to the ring itself, or to the tumor, must be hurtful, as they will increase the swelling of the intestine, and, of consequence, the strangulation. Even, if applied directly to the ring, they cannot relax it, but by the augmentation of bulk, which this tendinous part, as well as all other bodies, receives from heat, must make the stricture greater in some degree than before. They are, however, of great service, when

when applied to the muscular parts, by taking off that spasm which has been already mentioned, not only, as the original cause of the disease, but as preventing the reduction of the intestine. The best mode of applying these fomentations is by some of the largest sized ox-bladders, exactly covered with flannel, to prevent any moisture from touching the patient's body, and to cause them keep the longer warm. Fill those with about two thirds full, with water heated to 112 degrees of Fahrenheit, tie them fast, and lay one from the sternum of the patient downwards, with the fundus towards one side, and the mouth towards the other, so that the whole abdomen above the ring may be covered as much as possible. Thus, the spasm of the muscular parts being taken off, we may next put in practice, with the greater probability of success, a remedy prescribed by Dr Monro, and other eminent writers on surgery, *viz.* the application of snow or ice * to the ring and tumor themselves. As these substances, by their extreme cold, cause those parts to which they are applied powerfully to contract, and to shrink up into smaller dimensions, they must naturally diminish the bulk of the tumefied intestine, and thus

* In defect of these, we may use cloths dipped in a recent solution of sal-ammoniac in water or vinegar, which is intensely cold.

thus make it more capable of being reduced ; at the same time, by causing the substance of the ring to contract on all sides, the aperture is thereby augmented, in the same manner as, by the contraction of substance in a heated iron ring, the aperture of it will admit of a larger cylinder of iron or other metal when cold than when hot.

In the way above mentioned, *viz.* by the application of bladders filled with warm water, it is evident, that, by applying one after the other cools, we may continue the fomentation as long as we please ; and, when we have done so, every thing is done which we can do to remove the spasmodic affection of the muscular parts. Fomentations seem preferable to general warm bathing, as the latter acts not only upon the muscular parts, but on the ring and hernial tumor also. If, therefore, after continuing the fomentation for some time, we perceive no alteration in the size of the tumor, it is proper again to have recourse to pressure ; but, from what has been said, it must now appear evident, that the pressure at this time to be applied ought not only to be equal, but, if possible, stronger than the force which at first brought on the disease ; nor should it be intermitted, until every attempt that the strength of the surgeon can gradually make has failed. In one case, about
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seven years ago, where the patient had, by lifting an heavy weight, brought down a great quantity of the gut, every attempt was made for twenty-four hours to reduce it by gentle means, but in vain. Bleeding, injections, and anodynes, assisted by gentle pressure, had been employed to no purpose. At this period, I was called to the patient, and found, that, instead of obtaining any relief, the symptoms of strangulation were increasing, and the miserable patient had already consented to the operation. Before this should be attempted, however, I proposed that the effect of strong pressure should be tried; but, though the surgeon who had attended him from the beginning readily consented, he plainly told me that he did not expect any good from it, as it had so frequently been tried before. However, the experiment was made. Having laid the patient on his back in bed, with two pillows under his breech, and as many under his shoulders, distended his thighs, and bent his knees to an acute angle, we raised his thighs, and supported them; after which I stepped into bed, and placed my knees betwixt his, in such a manner as to be able with them to press upon the scrotum; the other surgeon, in the mean time, placing himself by the side of the patient, in order to assist the pressure of the intestine backwards through the ring into the abdomen. I then took the scrotum be-

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tween both my hands, grasping it firm, and pressing both my knees gently together, but keeping the pressure equal and firm upon my hands, increasing the pressure gradually; when, having nearly exerted my whole force in this way, the surgeon always pushing in a proper direction, we had the happiness, in less than ten minutes, completely to relieve our patient from his misery, by reducing the hernia. His after treatment I shall mention under its proper head.

If, after all the efforts which can be used, the reduction should still be found impracticable, the only possible chance we have of relieving the patient is by a surgical operation. To determine the precise time at which we should proceed to this last effort of art to save the patient is by no means an easy matter; though I cannot help thinking that it may be determined almost always to a certainty, and the patient delivered from certain death with little or no danger. From what has been already said, it must be evident now, that the only obstacle to the reduction is the resistance of the tendon, and until we are certain that this resistance cannot be overcome by more gentle means, it would surely be in the highest degree cruel, as well as imprudent, to think of performing the operation. But, when every attempt has failed, and the surgeon is conscious that no repetition of his former attempts

is likely to succeed, he must then surely have the approbation of his own mind in proceeding to an operation, which, though doubtful and dangerous, is better than leaving the patient exposed to certain death. In no disease, perhaps, does more depend on the activity of the surgeon than in ruptures. If the patient, for example, has for six hours laboured under some of the violent symptoms already enumerated, it is immediately incumbent on the surgeon to put in practice all the different methods above mentioned for the sick person's relief; and this, though done with as much expedition as possible, will in all probability take up six or eight hours more. Should these fail, he is then to tell the patient, or his friends, the extreme danger he is in, and to inform them that it will be necessary to perform an operation for his relief; the danger of which he may under-rate to the patient himself, though not to those about him; and having obtained the consent of all parties, no time consistent with the necessary preparations must now be lost.

From what has already been said concerning the nature of this disease, I hope it will evidently appear, that the only obstacle to the reduction of the contents of the sac is the ring itself, and to dilate it is all that is required; and before we attempt this, it is surely improper to allow

low the unhappy patient to be attacked with every fatal symptom attending a strangulated hernia. The operation is quite simple, and, when performed with proper care, must be attended with such certainty of success, that no patient, who has not been unreasonably prejudiced against it, would hesitate a moment at having it performed as soon as possible, after every other more gentle method has been tried in vain ; neither will any surgeon of character ever hesitate to propose, and instantly to execute what he knows to be for the good of his patient ; especially as he must know that every moment's delay increases the danger ; and the operation, which might have been successful if performed immediately, may prove entirely useless by being delayed for a short time. From the symptoms with which John Bannerman was afflicted, and the appearances observed on the dissection of his body, it is my firm belief that his life might have been saved, had the operation been performed only two hours before he died. That the symptoms of gangrene commonly enumerated by medical writers are equivocal, and not always to be depended upon, is evident from Bannerman's case ; and it is likewise evident that gangrene is not always the cause of death in herniæ, or other similar distempers, as no sign of mortification appeared after his death. The following

following is also a remarkable instance of the uncertainty of the signs of this fatal event.

A very delicate woman, in the fifth month of her pregnancy, was seized with pain and spasmodic contractions in her bowels. The pains shifted from place to place for the first twelve hours; after which they became more fixed, particularly about the umbilicus. For twenty-four hours they continued to increase violently, attended with severe vomiting and costiveness; when, by the force of the vomiting, and the stimulus of two strong injections of salt and water, the foetus was expelled. In three or four hours after this, I was sent for, in order to advise the midwife about bringing away the placenta. I found the poor patient in such a situation, that she could hardly utter an articulate sound; her pulse so weak that it could scarcely be felt; her extremities were very moist, and so cold, that it was disagreeable to hold them long in the hand, though her flooding had not by any means been excessive. Her appearance, in short, was such, that I could not but suppose that a mortification was certainly begun; and, of consequence, that she could not, in that situation, live many hours; however, I ordered her to be well covered up, and warm bricks to be applied to her feet and outside of each thigh; her hands and arms also to be wrapped up in flannel well toasted before

fore the fire, with a glass of port wine and a little nutmeg to be given every hour, as hot as she could swallow it. She still complained, as well as she could, of an excessive pain about the navel; and, while I was in the room, she was seized with a slight convulsive fit, which lasted five minutes, and out of which I did not expect to see her recover; but, contrary to my expectation, the placenta was expelled during its continuance, and in about fifteen minutes her pulse became again perceptible. My orders with regard to keeping her warm, &c. were punctually obeyed; though I must confess I had so little expectation of my endeavours being any way successful, that next morning I sent to inquire at what time she had died. To my astonishment, however, I received for answer, that by degrees she had recovered her warmth, and during the night had had a stool, with a considerable discharge of flatus, after which the pain of her belly gradually abated; and, by continuing her wine in proper quantity, and allowing her a nourishing and restorative diet, she, by degrees, recovered her former health, which she still continues to enjoy in perfection.

From these two cases it appears that coldness of the extremities, extreme weakness, nay almost a total cessation of the pulse, are no certain indications of an internal mortification; nor is
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the change of features (which in the woman's case just mentioned was very remarkable) any more to be depended upon. In Bannerman's case we see that all these symptoms, and even death itself, were brought on by an obstruction in the alimentary canal ; and in that of the woman, every thing which could be suffered short of death was occasioned seemingly by spasmodic affections. Hence it seems difficult for a surgeon to determine at what degree of height the symptoms must arrive before he absolutely gives over his patient for lost ; at the same time, that there is an absolute necessity for refusing to perform the operation when no hope of success remains ; for, should it be performed, and the patient die soon after, the by-standers would not fail to ascribe his death to the operation.

In those cases where the patient dies without any mortification having taken place, it is probable that the immediate cause of death is the violent affection of the nervous system occasioned by the intolerable pain, which entirely suspends every vital function. As long as the pain remains excessive, therefore, it would seem that there are some hopes of saving the patient by the operation, but, when this entirely ceases, and the patient's breath becomes infected with a cadaverous smell, it is then most probable, nay almost certain, that mortification has taken place.

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Even any considerable abatement of pain ought to be suspected, especially if the patient feels his faintness increase, and cold sweats, and coldness of the extremities, continue and increase. That we cannot in all cases ascribe the patient's death to the obstruction in the alimentary canal, we know from the shortness of time which it takes to destroy the patient. John Bannerman sunk under it in thirty-three hours; and we have instances of others having died in a still shorter space; but, in general, we will find that the violence of the distemper is indicated by that of the pain, and the danger of the patient is proportioned to the anguish which he endures. This seems to be the more probable, as we have instances of people dying of a strangulated hernia, where even the whole diameter of the intestinal tube had not entered the sac. Here even a total stoppage of the passage of the alimentary matter could not take place; and, even on a supposition of a gangrene and mortification having ensued, it seems surprising how the stricture in such circumstances could have been so great. It is probable, therefore, that the injury done to the nervous system, by the violent affection of the intestine, and the connection of other parts of that system with it, is in many instances the cause of death in herniæ where no mortification takes place. The intestines themselves are largely
supplied

supplied with nerves, and by their connection with the mesentery, which is also a membrane largely supplied with nerves, every affection of them is communicated to it. The stoppage of the peristaltic motion also cannot but violently affect the mesentery throughout all its parts; and hence probably in a great degree originates that horrid pain which is felt, not only in that part of the intestine most particularly affected, but throughout the whole belly. We must also remember, that, as the support and life of the body entirely depends on the proper digestion of the aliment, and this on the right performance of the peristaltic motion of the stomach and intestines, a very large share of the vital power must at all times be employed for preserving that motion. By whatever means, therefore, this motion is interrupted, the nervous influx, or by whatever name we please to denominate the vital power, is opposed or counteracted; and when this opposition comes to be excessive, the whole of that employed in circulating the blood, and enabling the brain to perform the functions necessary to sensation and animal life, likewise exhausts itself in overcoming the obstacle, and the patient dies.

In cases of hernia, therefore, where the surgeon thinks it necessary that the operation should be performed, he is to insist on its being done

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instantly;

instantly ; but, though the patient and his friends should oppose him ever so much for a long time, he is not to abandon his design, unless such evident signs of mortification have taken place that he cannot doubt of it. When the operation is determined upon, the patient ought to empty his bladder, and to have all the hair shaved off the lower part of his belly and scrotum ; he is then to be laid upon a table of a convenient height, in a room properly lighted, with his head and shoulders somewhat elevated, his buttocks also raised by pillows, and his legs hanging over the table. These ought to be secured firmly by the assistants, and opened so wide, that the surgeon may stand between them. The thighs ought to be as far raised as is necessary for relaxing the abdominal muscles, as well as the shoulders ; after which, the operator is to make an incision with a round edged scalpel of about three inches and an half in length, beginning about one inch above the upper part of the swelling, and continuing to divide the skin and cellular substance, for nearly two inches and a half below the ring. He then continues cautiously to divide every part of the cellular substance, or whatever tendinous like threads he may meet with ; and by this cautious method of proceeding, if there be no preternatural position of the parts, he will always be able to avoid the spermatic cord, or other large blood vessels,

vessels, which, by a more hasty proceeding, might be in danger of being injured. The ring must now be brought distinctly into view, with about two inches of the prolapsed sac, after which, the operator must gently introduce a small open pointed directory, represented, Plate 3. fig. 2. between the tendinous fibres of the muscle, in an oblique position, from the pubes to the spine of the ileum. A blunt pointed bistoury is now to be introduced into the groove of the directory, and by its means the ring dilated about a quarter of an inch. The directory is then to be laid aside, and instead of it the operator must use his finger, keeping the point of it always a little before the bistoury. He will easily feel when every obstruction is removed, by the ease with which it is introduced. If the strangulation of the intestine was in the ring, it will now be obvious that every obstacle to the reduction must be removed, when the finger can be easily introduced; and, of consequence, that the prolapsed intestines may now be returned without any difficulty. In young patients especially, however, such a degree of inflammation often takes place in that part of the peritonæum which forms the mouth, or narrowest part of the sac, and that, though the neck of the sac and the intestine may be totally freed from the pressure of the ring, yet the intestines cannot be reduced, by reason of a
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contraction and accretion having taken place in the neck of the herniary sac itself. This I have known to happen in three or four instances; and it is exactly similar to what every surgeon must have known to take place in those who died of ileus, where the internal circumference of the intestine is not larger than would suffice to admit a crow quill, and, by reason of this contraction, the whole has a callous feel. Such an obstruction, in the case of hernia, may be distinguished in two ways. 1st, The gut contained in the neck of the sac, as well as the sac itself, will be evidently seen by the surgeon, immediately upon cutting open the ring, not to expand themselves by reason of the stricture in the neck of the sac; more particularly, as the latter has previously been dilated about an inch or an inch and half, the neck of the sac is thus brought distinctly into view. 2d, When this accretion takes place, the operator will still find an obstacle to the returning of the contents of the bowels from one part to another; and though, by reason of the laxity of the peritonæum, the intestines may yield a little, and even almost disappear, if the hernia be only inguinal, yet the tumor will resume its former place, and cease as soon as the pressure is removed.

When this happens to be the case, there is a necessity for opening the neck of the sac, which may be done to most advantage by the sharp open pointed director, represented Plate 3. fig. 2.

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The point of the instrument is to be introduced by slow degrees below the fibres of the sac successively, until every one of them is divided, which may be known by afterwards introducing a probe into the opening. When the fibres are completely divided, this instrument will pass easily into the cavity of the abdomen, which it could not do before. It is then to be withdrawn, and bent at the point into a semicircle; the concave part of which is to be introduced immediately below the constriction, pressing it a little upwards; and by pushing that part of it in your hand a little from you, the point will always be found to push outwards above the stricture in the neck of the sac of the peritonæum. By now cautiously cutting or scratching upon its point the button of the probe will pass outwards; after which the point of it is to be laid hold of along with the other end of the probe, and raised a little, and then the surgeon must cautiously cut upon the probe until it be freed, by which means every obstruction will be completely removed, and the reduction of the intestine easily effected.

After the operation is finished, the sides of the wound are to be drawn gently together, by means of slips of adhesive plaster, in the same manner as described in that chapter which treats of the Dry Suture. Several folds of charpee are then to be laid over the slips of plaster, and the

the whole secured by a T bandage, or suspensory bag properly filled with soft lint. Care must be taken, in laying the patient to bed, to put a pillow under his buttocks, to elevate them a little above the rest of his body. An opiate must then be given, and repeated as the urgency of the symptoms shall require. The patient must be kept very cool; and if he is of a plethoric habit, a few ounces of blood must be taken away as his strength can bear. Strict attention must also be paid to his regimen, which ought always to be low at first, though it may be varied as the symptoms or strength of the patient may indicate. The belly ought to be kept open by glysters and gentle laxatives; and this perhaps is more requisite in hernia than any other disease whatever. The dressings must not be removed for three or four days; and, if the person survives that period, the sides of the wound will be found almost adhering together; and, if care be taken in the application of the next dressings, the whole will be completely cicatrised in twelve, fourteen, or sixteen days.

In performing this operation, we are never to open the sac itself, except in the case above mentioned, where the parts are strangulated within it, or where the case is of long standing, and the patient has suffered much before the sur-

geon

geon was called in. Where this happens, the tumor also being very large, extending even to the bottom of the scrotum, and all the symptoms of strangulation run very high, with hiccup, quick feeble pulse, and constant vomiting; the surgeon, after trying to relieve his patient by evacuating the colon and bladder, and attempting to reduce the intestine by pressure, must proceed to the operation. The patient must be laid upon a table in the position above described; the operator is to grasp the scrotum on the under side with his left hand, so firmly as to make the skin tense on the anterior part of it; then, with a round edged scalpel, to divide the skin freely from about an inch and an half above the upper extremity of the tumor, to the bottom of the scrotum, cautiously dividing also the cellular membrane, &c. as already directed, until not only the ring but the whole sac be distinctly brought into view. The latter, if not very much thickened, will be easily distinguishable by its transparency, which is so remarkable, that, in many cases, I have seen the bowels quite distinctly through it, after the skin and cellular substance had been accurately separated.

When the operator has proceeded thus far, he ought by no means to be hasty in opening the sac, though most writers have directed this to be done immediately; as a great part of
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the gut would thus be exposed to the air, as well as in danger of violence from the hand of the operator. Instead of this, he ought immediately to dilate the ring, as already directed. If, on doing this, the parts which had been immediately confined in the ring expand themselves completely, so that the operator can perceive no interruption between those in the sac and in the abdomen, it is a certain sign that the stricture is entirely removed, and the bowels will almost return of themselves to their natural position, whatever they may be which have prolapsed; and, when this is done, the symptoms will instantly abate in a great degree.

While matters are in this state, I am of opinion that the surgeon may safely wait twenty-four hours; and that he ought to do so at the least, before he proceeds to examine the gut minutely, either with a view to discover adhesion or gangrene. A gangrenous tendency will most probably, in ninety-nine cases out of an hundred, be taken off by simply removing the constriction, and the adhesions will not be increased. Even if a small spot should be gangrened, or completely mortified, it would soon be discovered by the contents of the intestine being pushed towards this part of the sac; and in this case only, that part of the sac which is opposite to the mortified place should
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be opened, in order to form an artificial anus, which, it is more than probable, would heal of itself, as I have known it to do in several cases, where the intestine has adhered to the peritonæum, and inflammation, ending in suppuration, has taken place through the whole substance, both of the intestine and integuments. In these cases, a discharge of fæces through the opening took place for a long time, but always healed up at last; and, even where the circulation of the blood is almost if not entirely stopped, by means of stricture on the intestine, it must follow of course that the absorption will be diminished in proportion, or even entirely stopped; the only cure, however, must be by removing the compressing cause; and putridity cannot take place, unless from one of the following causes; 1st, From an actual mortification, known by the signs formerly mentioned; or, 2d, From the admission of air, which cannot be the case, while the sac remains whole. It has indeed been urged, as a reason for opening the sac, that the appendix vermiformis has sometimes been found twisted round the protruded intestine; but, if the rupture be on the left side, this can never happen; and I am of opinion that, in scrotal herniæ, it can very seldom take place even on the right side; and, if it should happen to be the case, it is most pro-

bable that this appendage would recover its natural position as soon as the intestines were replaced. Another reason given for opening the sac is, that those who have been in use to return the intestines without doing so, have sometimes found, after the death of their patients, that the parts have been constricted within the abdomen. Instances of stricture, from the accretion of the neck of the sac, have been indeed frequently observed, as already mentioned; and the same thing may very possibly take place in the gut immediately compressed by the ring and sac. Strictures of this kind may take place, both in the descending and ascending parts of the gut, so that a foot and an half of intestine may sometimes intervene between the two constrictions; but, should the gut at the stricture be contracted and hard, and the passage very small; I am not of opinion that the patient can receive benefit from any operation, by cutting away that part of the gut between the two constrictions. On the whole, it appears to me probable, that, in recent cases, the patient will be cured almost without danger, by simply dilating the ring, so that the parts can be reduced. When the obstruction arises not from the pressure of the ring, but of the neck of the sac, the latter must be opened with the precautions already mentioned, but without making any
larger

larger incision than is necessary. From repeated descents, however, or, from other accidental causes, a case may happen where it will be necessary to lay open the tumor from one end to the other. In this case, we must carefully examine whether any part of the gut is mortified; and, if so, it must be carefully removed, and the discharge of fæces through the external opening facilitated as much as possible, until nature effects a complete cure; which, as has already been observed, will very frequently be done. In all cases, however, opening the sac must be avoided where it can possibly be done; for nothing is more pernicious than exposing the bowels to the action of the air; and to this practice we may not unjustly ascribe a great number of the fatal events attending the operation for hernia. When properly performed, the danger to the patient is by no means great, as will appear from the following cases.

Mr R—, aged sixty, had for several years laboured under an inguinal hernia, but had never found any difficulty in relieving himself, by lying down on his back, and gently pushing up the protruded parts with his hand. On the 28th of May 1738, however, having used a good deal of exercise, he had a
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return

return of his complaint in a much more violent manner than usual. His first symptoms were gripes about the navel, with pain all over the belly; and, after these had continued violent for two hours, he was attacked also with a violent pain in the left groin; such as he had formerly experienced, when afflicted with his herniary complaints, and which had always obliged him to go to bed. On the first attack of this symptom, he attempted, with all the force he was master of, with both hands, to prevent the further protrusion of the intestine, but in vain. The pain about the navel increased, accompanied by a violent pressure; so that, in a short time, almost the whole of the scrotum was filled with protruded intestine. In a few hours he was attacked with sickness and vomiting, the pain still continuing as violent as before; and, by the vomiting also, the swelling was increased still more. In this situation he continued all night, and next day sent for me. On inquiring into the state of his health, previous to this attack, I was informed that he had not had a stool for the three days immediately preceding. At the time I saw him the pain was excessive, both at the ring, and about the navel; severe fits of vomiting came on every half hour, and the pulse beat 120 strokes in a minute. Sixteen ounces of blood were taken from

from him, while in an erect posture; after which he was laid in a proper position for attempting to reduce the intestines by pressure. The first attempt proving unsuccessful, four pounds of water, in which half an ounce of soap had been dissolved, were injected by means of a syringe, in about an hour after. In fifteen minutes, this procured a copious discharge of hardened fæces, and another less hardened in about two hours after, with relief of sickness and vomiting, as well as abatement of the pain. Another attempt was now made to reduce the parts by pressure, but without effect; and in about three hours from the last discharge by stool, all the bad symptoms began to increase; his pulse, however, beat only about 100, but was rather weak. Another injection of four ounces of mucilage of gum Arabic, with 100 drops of laudanum was given; the whole of the ring and abdomen were covered with blades filled with water as hot as the patient could bear it; and this was continued for near an hour; the symptoms were still not relieved; and, as it was now late, I determined to make no farther attempt that night; but directed the fomentations to be continued, and two grains of opium to be given every three hours during the night.

26th, The injection had been returned with
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the discharge of some wind, and a little fæculent matter; but the symptoms of hernia remained the same as before. A third attempt was now made to reduce the intestines, but with as little success as before. He was therefore taken out of bed, and placed in a great chair, with a pillow laid upon the back of it, from the bottom upwards, and another over the back of it. His head and shoulders were then placed on the bottom of the chair, and his body on the back of it, in such a manner that his legs hung over the pillow upon the back of it; and in this way, with his head downwards, every practicable attempt was made to reduce the protruded parts, but without effect. As night approached, all his bad symptoms, particularly the vomiting, increased; his thirst became considerable, and the pulse was increased to 116, and feeble. The operation was now proposed, but refused both by the patient himself, and his friends. His anodyne injection was therefore repeated, and it was now determined to try the effect of cooling applications. Cloths dipped in a mixture of equal parts of vinegar and water were applied to the tumor and ring, and directions given to keep the parts constantly wet with it.

27th, All the bad symptoms increased, and to the rest of his complaints, an hiccup was now superadded; pulse upwards of 120, and feeble;
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the swelling as last night. The danger was now so evident, that no farther objections were made to the operation ; and it was performed, about 64 hours from the first attack, in the following manner. The patient being laid on a table, as already directed, an incision was made through the skin and cellular substance to the sac, beginning about two inches above the upper part of the swelling, and continuing it three inches below the ring, so that the ring itself, as well as three inches of the sac was laid bare. A common directory was then introduced between the ring and sac ; and thus the ring being dilated as far as would admit the point of the forefinger, and then the whole was laid open as already directed. This was no sooner done, than the neck of the sac, which had been compressed in the ring, dilated itself to the full extent of the opening ; and on this the bowels were reduced, and the sides of the wound brought together by means of straps of adhesive plaster, as formerly mentioned. The whole was then covered with several folds of scraped lint, and dressed as directed. On being put to bed, his breech was considerably elevated above the rest of his body, and he had a saline draught in the act of effervescence, with 50 drops of laudanum.

28th,

28th, Slept four hours after taking the draught. Vomited a little in the morning, but the sickness now almost entirely gone, and the pain very considerably relieved. Has a sensation of wind going through the whole abdomen, and passed some this morning, with great relief. Has no pain nor uneasiness in the wounded part. Ordered a large injection of water and oil, and the anodyne to be repeated at night.

29th, Injection operated copiously, and gave great relief. Pain and sickness almost entirely gone. No complaint from the wound. Pulse about ninety-six, and soft. Ordered chicken broth for his ordinary drink, and in the morning a tea spoonful of an electuary of crem. tart. with syrup, to be taken every hour till it operate.

30th, Electuary operated well. Pain and sickness gone. Pulse about eighty-four, appetite returning, and slept well during the night. Feels no uneasiness in the wound. The anodyne not repeated.

June 1st, On inspecting the wound, the greatest part, from the bottom to near the ring, was healed by the first intention. It was again dressed, as before. Thinks himself perfectly well. Allowed him some animal food, and a bottle of the best London porter, through the day.

6th, Has no complaint. Wound dressed, and almost well. No swelling at the ring. Ordered him, much against his will, to keep his bed four days longer.

10th, Wound quite healed, except about half an inch, just where the ring was dilated; but no discharge from it; otherwise in good health. For these last three days has been allowed to sit up in bed, and for two nights to sit up an hour in a great chair; from which he felt no inconvenience.

16th Wound completely healed. No swelling or pain at the ring. Ordered to continue his bandage.

This patient has now been well for five years, without ever having the smallest return of his complaint, but still continues his bandage.

Mrs H——, fifty-two years of age, on lifting a heavy weight, was suddenly attacked II. with a pain and swelling in the top of her right thigh; both of which continued to increase for several hours. About six hours from the first attack, I found her complaining not only of pain in the tumor, but about the navel; which pain, she said, arose from the tumor, and which was about the size of the fist.

In this case, I began with taking away as much blood as the patient could bear, with a view to relax the stricture on the parts; after

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which

which, I attempted to reduce the intestine by pressure, but without success. The contents of the colon were evacuated by means of an injection, but without any relief. The symptoms of strangulation continued to increase; and in twelve hours from the first attack, the danger seemed to be very considerable. The pulse now beat one hundred and twenty in a minute, and was small and weak; her vomiting almost constant, and the pain exquisite. Fomentations were applied in the manner above directed, but without success. Cold applications were next tried. Two ounces of sal-ammoniac were dissolved in a mixture of four ounces of distilled vinegar, and twelve of water; and cloths dipped in this solution, were applied to the swelling, and under part of the belly. An injection was given with a hundred drops of laudanum, and repeated in three hours after, but without the smallest relief. Pressure was repeatedly tried, and the body put into every position which might facilitate the reduction, but without effect; the complaints continued to increase, and an hiccup was now superadded to the rest.

In this deplorable situation the operation was proposed, and the patient immediately consented. She was then laid upon a table, in the manner already directed, and properly secured, after which, an incision was made through the whole
length

length of the tumor, so that the sac was brought distinctly into view, as was also the ligament called Poupart's; under the edge of which, I introduced a pretty strong spatula, and then gently scratched the ligament almost completely through its whole breadth. As no strangulation appeared in the neck of the sac, the bowels were easily returned; the sides of the wound were gently drawn together, by means of adhesive plaster, and covered with scraped lint; a small cushion of tow, with a compress of lint, was laid over it, and the whole retained by a flannel roller, put round her body, and the top of the thigh, so as to form the figure eight on that part, which was immediately covered by the dressing. She was then put to bed, without any anodyne, having got by injection two hundred drops of laudanum, within three hours of the operation. In a about an hour and an half after being put to bed, she became quiet, and slept five hours; and, on waking, drank some rice gruel, which was retained; though she still complained of much pain about the navel. As the pulse continued sharp, and beat a hundred and twenty strokes in a minute, I took eight ounces of blood from her arm, and ordered her belly to be fomented for half an hour, with flannel wrung out of warm water; and the fomentation to be repeated every three hours. This was attended with
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the happiest effects : the pain of her belly diminished after every fomentation, and she passed considerable quantities of wind with great relief. In thirty-six hours from the operation, she had a natural stool, and her pulse was reduced to one hundred. On the fourth day, the wound was dressed, and looked well, without any protrusion of the gut, the sides of the divided place being in contact, though not yet adhering. The cure was completed in twenty-eight days ; during all which time, she had only two large injections of water and oil, with two drachms of crem. tartar, morning and evening, every second night ; the wound being dressed every third day. It is now three years since she recovered, and has had no attack of her disease, though the wearing of a bandage has been necessary all that time. So far is she from having been intimidated by the pain of the operation, that she has repeatedly declared to me, that were she to be attacked a second time, she would not endure one half of what she suffered formerly from the disease, for fear of the pain of the operation.

J. M.——a man of sixty years of age, remarkably strong and healthy, was attacked, in September 1787, with a very large inguinal hernia. As he could not reduce the intestine by his own efforts, he sent for me eight hours after

III.

after the first appearance of it. I found him complaining of great pain from the ring upwards, attended with sickness and costiveness; the swelling extending from the ring to near the middle of the scrotum on the right side. A large injection of the kind formerly described was immediately administered, which had the effect of clearing the colon perfectly; and finding him well able to bear the loss of blood, I took away twenty ounces while he was in an erect posture. In about ten minutes after the bleeding, I made an attempt to reduce the intestine, by laying him on his back, with his breech and shoulders a little elevated, in order to relax the abdominal muscles; then taking hold of the tumor firmly, about the middle, with my left hand, I endeavoured with the right to press up that part of the intestine which came last down, in the way formerly directed, increasing the pressure gradually, until my whole force was nearly employed. The attempt proved successful; so that in about fifteen minutes from the time I first began, the hernia began to pass upwards through the ring; and a short time afterwards the whole tumor disappeared. I instantly gave him an anodyne with thirty-six drops of laudanum, and laid him to rest. Next day I found him well, and he continued to be so till the month of March 1788, when, having neglected to put on
his

his truss, which he had continued to wear ever since the last attack, the distemper returned to such a degree that I was immediately sent for. I succeeded in reducing the intestines as formerly, and he continued to enjoy good health till the 20th of October 1791, when I was sent for to visit him about two o'clock in the morning, and had from him the following account of his case: "Going to bed in my usual health, I was soon after seized with the most violent pains in my belly I had ever felt, with a general contraction of my whole belly; my rupture at this time was forced down to a greater bulk than ever, so that immediate death was apprehended." As from this account it seemed probable that his complaint arose from a spasmodic affection of the abdomen, I ordered him immediately two grains and an half of opium, and his belly to be fomented for an hour with flannel wrung out of boiling water. At seven next morning I found the swelling as before, though the pains were much relieved. Reduction by pressure was now attempted in vain, and the attempts for this purpose increased his pain to an extreme degree. I took about sixteen ounces of blood from his arm, and applied a poultice made of the crumb of bread, with a solution of an ounce of sal-ammoniac in a mixture of two ounces of distilled vinegar, and fix of
common

common water ; after which I left him again for two hours, during which time the hernia was spontaneously reduced, and the following is his own account of the matter : “ In less than an hour the rupture disappeared, the pain abated, and I got much ease and composure. I continued very weak for several weeks, had several returns of my complaint with acute pain ; but by immediately lying on my back, as directed by Mr Latta, it soon removed at these times without putting a hand to it. For twelve months past I have not had the smallest symptom of it, nor any swelling or pain in that part, and I enjoy good health and spirits.”

In June 1791, I was called to J. K. a IV. young man of twenty-one, and found him labouring under a very considerable scrotal hernia, of the approach of which he had the following symptoms, which I shall describe in his own words : It began, and always does, with a cold uneasy sensation in the bowels for the space of an hour or two, sometimes for a much longer time. This is followed by severe griping pains about the navel and under parts of the belly ; and about an hour after the griping comes on, the intestine is pushed with great force into the scrotum, so that it cannot be prevented by the greatest pressure with the hand. Vomiting comes

on

on a short time after, by which the pain and swelling are augmented to an extreme degree; every kind of liquid is rejected almost as soon as swallowed." In this state he had remained for six hours before I saw him; had been blooded freely, and got an anodyne draught with fifty drops of laudanum, which he had immediately vomited. By my direction he took two grains and an half of solid opium, was again blooded freely, and had an injection of pure warm water; the abdomen being well fomented according to the directions already given. By these means the tumor was reduced in two hours after I saw him, he had a refreshing sleep of several hours duration, and quickly recovered for that time. He has since had three different returns of his complaint, each of them attended with the symptoms above mentioned, even though he has not been costive before; but by following the method already directed it has constantly been reduced, although the last time it was more than twenty-three hours down. This patient is naturally so costive, that he has not a stool once in three days after his complaint is relieved; and even then, unless he has taken a gentle laxative, the fæces are quite hard and dry.

In July 1788, I was called to Mrs M^cK.— V.
a married woman, thirty-six years of age, who
had

had been ill for six hours. Her complaint began with a very large swelling in the right labium pudendi, attended with great pain throughout the whole belly, (particularly about the umbilicus), nausea, and frequent vomiting, having been costive for two days before. The pulse was no more than eighty, but rather small and sharp. I endeavoured to reduce the tumor by laying hold of it about the middle with my right hand, and with the thumb and two fore fingers of the left pushed in the intestine, according to the directions already given in this chapter, but without success. Recourse was next had to phlebotomy; she was bled in a fitting posture till she fainted. On this I tied up the arm as quickly as possible; and, before she was entirely recovered from her faint, made another and more successful attempt to reduce the intestines, by making the pressure a little more strongly than before. In an hour or two after the reduction, all her distressing symptoms vanished, and a stool was procured, by taking a tea spoonful of lenitive electuary every two hours. She was ordered to wear a truss to prevent a relapse; and since that time I have never heard of her being troubled with any return of her complaint.

Mrs R—, aged fifty, was, in the month VI.
of January 1781, suddenly attacked, upon
rising hastily out of bed, with a pain in her left
groin, which instantly increased to such a degree,
that she was obliged to go to bed again. On
feeling the place where the pain was most severe,
she discovered a swelling about the size of an
egg, which surprised her much, having never
been subject to any thing of the kind before.
The pain continued to increase, and quickly be-
gan to affect all the rest of her bowels with
gripes and sickness, attended at intervals with
vomiting. When I came, she told me that the
swelling had increased greatly in size, which she
attributed to her constant vomiting. She had
in general been costive, but her belly was easy
the day before. Her pulse was ninety, and rather
low. I succeeded in reducing this hernia by
pressure in about fifteen minutes, which almost
instantaneously relieved the patient of all her
bad symptoms. Next day I found her well,
and able to go through the house; but I now
took the opportunity to tell her the true nature
of her disease, and that unless she used a great
degree of caution, it would probably return, and
that perhaps with such violence, that it might not
be in any man's power to relieve her with such
ease as I had done the day before. I advised
her therefore to wear a truss, to prevent the re-
turn

turn of her complaint ; she followed my advice, and since that time I have never heard that she had any symptom of the kind.

On the 26th of August 1789, J. H—, VII.
aged thirty-six, by trade a taylor, was attacked in the morning with a sense of coldness in the belly, particularly about the region of the stomach. Finding this to increase, he took a glass of spirits, but soon after vomited what he had taken, and reached very severely. A pain at the umbilicus, which was now superadded to his other complaints, greatly increased his vomiting, at the same time that he complained of an acute pain in the left groin, which increased along with the other symptoms. When I saw him, his pulse was small, and about 88 ; there was a swelling in the groin of about the size of a large hen's egg ; but, to my feel had at that time spread under the skin and cellular substance, in a direction towards the anterior part of the ileum, instead of passing towards the scrotum, as usual with herniæ, so that it put on exactly the appearance of a bubo, and had the same feel as one just ready to suppurate. On inquiry, I found that he had a natural stool about six hours before the symptoms came on. Perceiving plainly that his disorder was an hernia, I bled him about fourteen ounces, ordering

dering an injection, with four ounces mucilage of gum Arabic, and 150 drops of laudanum to be given immediately after. In four hours after I visited him again, and found that the blood had a very buffy coat, his vomiting and gripes were much abated; but, upon attempting to press up the intestine, he complained of the most exquisite pain, so that I was obliged to give over. As his pulse was now much fuller and harder, I again bled him ten ounces, ordering his friends to foment his belly with bladders, filled with warm water, as before directed. The fomentations were continued for an hour; and in three hours I paid him another visit. I now found the tumor to pass, as it were, directly inwards, and completely upwards; though it seemed rather to return again a little after taking away my hand. Soon after this, he felt all his complaints considerably easier; but next morning I was again sent for, his vomiting and other symptoms having returned during the night. The swelling had again returned to its former size, and I found that I could again return the contents of the tumor apparently through the ring, but without the smallest relief to the patient; so that I could now no longer doubt that the strangulation was in the neck of the sac; and consequently, that unless this was opened, the patient had not the least

least chance for his life. This I instantly communicated to his friends, urging them, at the same time, to call in some other medical gentlemen to my assistance, as nothing but an immediate operation could save the man's life; and the same I hinted to the patient himself, in the most gentle way possible. In about an hour he consented to allow me to do whatever I thought proper, as soon as I could have every thing in readiness. Having then laid him upon a table, in the manner already mentioned, I laid open the tumor through the whole of its length, that I might distinctly ascertain where the stricture was. Having done this, I found that the sac, with its contents, could be with the greatest ease passed through the ring, and that the latter was considerably dilated. I then continued the incision about an inch farther up above the ring, so as to lay bare a part of the peritonæum; on which I saw very distinctly that the contraction was in the neck of the sac itself, which appeared as if it had been tied with a cord; the peritonæum being very much inflamed above the ring, and adhering strongly to the abdominal muscles there, the sac was also considerably inflamed, and almost grown together at that part. The sac was next opened with the utmost caution just below the stricture, and I introduced through the wound a strong probe, bent at
the

the point as directed, making it pass within the cavity of the abdomen, so as to touch the peritonæum immediately above the neck of the sac, and within the cavity of the belly. I then cautiously scratched the part till the point of the probe came through the opening in the belly above the stricture, and pushing it in a little, and lifting it up at the same time, I cautiously cut through the whole of the stricture; on which the gut passed up, but the sac remained down, though it did not adhere to any part. The reason of this seemed to be from the adhesion of the peritonæum to the muscles; but, as it was a large loose bag, I now cut it away altogether by the neck; and, during this part of the operation, my assistant held up the intestine with his fingers. There was not a drop of any kind of fluid in the sac. The lips of the wound were brought together by adhesive plasters, and covered over with scraped lint. A roller of linen was passed over his body over the dressings, and likewise several times round the top of the left thigh, in order to press gently upon the parts. He was put to bed as directed, and ordered an anodyne with forty drops of laudanum. In twenty-four hours after the operation he was almost quite free of pain, sickness, and hiccup.

August 28th, Had an injection of about one pound of warm water, with two ounces of oil,
which

which operated well, and with great relief. Did not complain of pain in the wound, but was thirsty, and his pulse beat 100 in a minute. Barley water was ordered for his ordinary drink, and his opiate continued.

29th, Slept six hours at once. Feels little or no pain. Sicknefs and hiccup entirely gone. Glyster to be repeated in the evening, with the opiate at bed-time.

30th, Has rested well. Pulse 90. No pain from the wound. Appetite returning. Had a natural stool this morning. Had a bason of veal broth to his dinner. Took away the dressings, and found the straps still adhering, and the lips of the wound in contact; but no particular pain or fulness upon pressure. Dressed the wound as before; but allowed him a little beef-steak, and a glass of wine and water for dinner.

31st, Rested well; had a natural stool this morning. Continues still to do well. Pulse 80.

September 4th, Wound almost entirely healed. Has begun to take his ordinary diet, and has no complaint. In fourteen days after the operation was performed, the wound was quite cicatrised. A truss was then fitted to it, and in four days more he walked abroad. Since that time he has never had the least return of his complaint; and, at the time of writing this, was in good health.

January

January 3. 1793, J. Y—, 30 years of age, VIII.
was early in the morning attacked with coldness in his bowels and sickness; and in about an hour after with pains about the navel and lower belly, striking down towards the left groin. The pain soon increased to a great degree, particularly at the groin, where a small tumor was perceptible. I was called about four hours from the first attack, and found him tormented with pain, attended with thirst and vomiting; the pulse ninety, and rather sharp. The swelling in the groin was about the size of an egg, but so painful that he could not bear it to be touched. Twelve ounces of blood were instantly taken away; and, as he could not allow me to touch the swelling, I ordered his belly to be well fomented with flannels wrung out of boiling water, according to the directions already given. The swelling was likewise bathed frequently with a solution of an ounce of sal ammoniac, in a mixture of six ounces of water, and two of vinegar.

In the afternoon I found all his complaints much increased, and the blood which had been drawn covered with a thick buffy coat. Ten ounces more of blood were taken away; but he would not allow me to touch the swelling. I was now informed, that, for some days previous to this attack, his belly had been natural,

or rather loose than otherwise. An injection of four ounces of mucilage, with 150 drops of laudanum, was now ordered, and the fomentations continued.

Next morning I found the complaints not in the least abated; only, after great persuasion, he now allowed me to use a very gentle pressure for very a little time, but without the smallest effect. The fomentations were still continued, and the injection repeated. Calling upon him about mid-day, I found him still in the same situation, and all times distressed with hiccup. Gentle pressure was again tried, without effect. The operation was proposed in the most gentle manner; but neither himself nor his friends would consent. At night the hiccup increased, but the pain at the groin was somewhat easier. He still complained of severe gripes and vomiting; and, on examining the tumor, it was not in the least diminished, nor could it bear any pressure. A large glyster of warm water was administered, and the fomentations renewed. The operation was again proposed, but he would not consent. Next morning the former symptoms continued, with this addition, that his features were now much shrunk, his hiccup and vomiting constant, and his pulse small and quick. I now informed his friends, that if they did not allow me to lay open the tumor,

he could not survive many hours. No persuasions, however, could prevail; and he accordingly died on the evening of the fourth day from the attack.

On opening the body, in presence of his friends and several medical gentlemen, I found the sac mortified from the neck downwards; but, having cleaned the parts well with sponge and water, the gut was found not to be affected. I then laid the ring completely open, and endeavoured to dissect the muscles from the peritonæum, but found the adhesion so strong, that it was impossible to separate them even with the knife. We now saw plainly the neck of the sac, which appeared to surround the gut so closely, that no art whatever could have made it pass through this stricture; but, on cutting open this part of the sac, by introducing the point of the probe as directed, and thus setting the gut at liberty, there did not appear to be any adhesion between them. Both above and below the contracted part, the guts were very much distended with wind, but below the ring they seemed not to be so particularly filled with the contents of the abdomen as with flatus. The whole under part of the sac was destroyed by mortification, apparently owing to the total stoppage of circulation in it, by reason of the inflammation and accretion already mentioned. The gut was of a dark colour, but did not seem to have any tendency to gangrene; the peritonæum

næum within the belly was very highly inflamed for several inches round the ring, and the guts were considerably inflamed, and much distended above the stricture. There were no fæces in the colon, but the whole of that part of it which forms the sigmoid flexure was so much contracted, that it could do little more than allow the forefinger to pass into it. The rectum was also contracted in a similar way.

M. D—, a servant maid, thirty-two years of age, had for six days laboured under a IX.
crural hernia, but for the first four, the symptoms were so trifling, that she had continued at her work, and been almost constantly on her feet. At last the swelling began to increase, with all the symptoms peculiar to the disease, as gripes, sickness, nausea, and vomiting. I saw her on the morning of the sixth day from the attack, and found her much reduced by constant gripes, thirst, and vomiting. Her pulse was extremely quick and feeble; and she had not had a stool from the beginning of the attack, though I was informed that injections of every kind had been administered, and she had taken strong infusions of senna and manna; pills of calomel, jalap, &c. with no other effect than that of increasing the vomiting and every other bad symptom. Having examined the swelling, and considered the state
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in which the patient was, and having likewise consulted not only with the gentleman who had occasionally visited her, but with the first adviser in Edinburgh, it was agreed that nothing could give her the least chance but endeavouring to dilate the ligament. The poor patient, already reduced to extremity, instantly consented; and, as soon as the necessary preparations could be made, the operation was performed upon her bed, by bringing it forward to the light, and laying her across it with her legs and thighs over the edge. An incision was then made through the skin, cellular membrane, and fascia of the thigh, beginning an inch and half above the upper part of the tumor, and reaching quite to the bottom of it. The sac was now cautiously laid bare throughout its whole extent, together with the ligament; after which, the point of the grooved directory was introduced between the under edge of the ligament and the sac, and by scratching the ligament almost entirely through, it was thus completely dilated; but, upon attempting to return the contents of the hernia, I found them fixed. The sac itself was then cautiously laid open, when the gut was found adhering to it through the whole extent, and that it was contracted to the size of one's little finger, throughout the whole length of the protruded part, which was upwards of twelve inches in length. The adhesions, however,

ever, were easily removed by the finger, or a common spatula ; but, on freeing the gut completely, it was found that the operation was too late. The intestine had been so long contracted, that it would not dilate itself. The question now was, whether I should cut away this constricted part altogether, and endeavour to unite the divided ends by a stitch or two. To this, however, the gentlemen would not consent, as they thought the patient could not, at any rate, survive a few hours. The wound was therefore dressed, and the intestine not returned, that we might see how the patient did in two hours after. She was laid to bed as quiet as possible ; the pulse beating one hundred and forty in a minute, and very feeble. Every symptom of debility, &c. grew worse, and in five hours from the operation she expired. The whole length of time taken up by this operation was no more than eighteen minutes, including the dressing of the wound, and the parts were as little exposed as possible. Not a drop of any kind of fluid was met with in the sac.

From these cases, I think it is evident that the operation for a bubonocoele, when performed in time, is attended with little or no danger ; while, on the other hand, if delayed even for a short space of time, it may prove unsuccessful, by reason of the contraction of the gut having become

become infurmountable, even when the obstruction is removed. In this case, the only chance that a patient has for life, is the cutting away that portion of the gut which is thus contracted, as if it was entirely mortified ; for, though this be not actually the case, it is certainly in as bad a state as if it were. Indeed, considering the little risk which attends the performance of this operation, it deserves well to be considered, whether the mere circumstance of the extreme pain suffered by the patient be not a sufficient reason for operating as soon as possible, even independent of any other consideration. If, for instance, by operating in the morning, we can save the patient from five or six hours of the most intolerable torment, which he must otherwise endure if let alone till afternoon, it is certainly a humane action to do so ; even granting (which never can be the case) that the delay of five or six hours is a matter of no importance as to the life of the patient itself. All who have suffered under this disease agree that the pain attending it is exquisite beyond comparison, insomuch that we cannot help supposing they suffer as much every hour, as if a continued operation was performing upon them, which yet lasts only a few minutes. It has been remarked, that the French surgeons treat *herniæ* much more successfully than those of Britain ; and this we can-

only

only attribute to their being more ready to perform the operation than here; so that, unless the obstinacy of the patient himself be the obstacle, it would seem the most eligible method for the surgeon to proceed immediately to the operation, as soon as he sees that the success of his efforts for reduction by pressure becomes ultimately doubtful, without waiting till it becomes altogether desperate.

In those cases, where the hernia has been of long standing, and very great and strong adhesions have taken place between the sac and intestines, the reduction becomes then evidently impracticable. Of this kind of hernia which is called *chronic*, we have already taken notice, and pointed out the danger to which patients subject to it are liable. An operation can never be of any service to such people, and therefore ought by no means to be attempted, unless recent symptoms of strangulation should occur from the protrusion of a fresh portion of intestine, or some affection of that which is already down. Nothing more can be done to keep such patients easy in general than to provide them with proper suspensory bandages, keep their bowels open, and warn them of the danger to which they are continually liable, and which they will increase, by using any violent exercise, as running, leaping, &c., which last, is particularly

larly dangerous, as well as lifting great weights, or indeed any thing which occasions a violent action of the abdominal muscles.

With regard to the different kinds of herniæ which have been mentioned by medical authors, they all require one general method of treatment, varying according to the particular part through which the intestine is protruded. The crural hernia takes place in women much more frequently than in men, on account of the largeness of the pelvis of the former; but in both the gut is found in the same place, *viz.* the top of the thigh; passing through the same opening with the femoral artery and vein. This opening is formed by the ligament called *Poupart's*, or *Fallopious's*, reaching from the spine of the os ileum to the crurt of the os pubis, where it is inserted near the symphysis. This kind of hernia requires the same kind of treatment with the others; only, in attempting to reduce it, the pressure must be made directly upwards; and, in case of failure, we must then have recourse to the operation, which will be successful or otherwise according to the circumstances of the disease, and of which two examples are already related.

In the crural hernia a ligament is the obstructing cause, and the cure is effected by the dilation of it. The operation is performed by making

ing a free incision of the external parts, beginning about two inches above the upper part of the tumor, and extending it to nearly the same length below it, dividing with great care the fat and fascia lata of the thigh, till you come to the herniary sac. Thus the ligament will plainly be seen, and, by carefully dissecting away the fat and fascia of the thigh on each side, till you come to the insertion of the ligament, and then dissecting it gently away from its insertion into the crust of the pubes the stricture will be completely removed; and this may be done without the smallest danger of cutting either the spermatic vessels in men, or the epigastric artery in women, where these vessels are in their natural position. Instances indeed, are said to have occurred where the spermatic vessels lay on the anterior part of the tumor; and therefore the utmost caution is always necessary in making the incision; and, in order to avoid them, the operator must divide the integuments very slowly, observing with the utmost care whether any large blood-vessel lies in the way. After the incision is made, the gut must be reduced by pushing it upwards, having gently elevated the breech in order to facilitate the ascent of the intestine. The wound is to be dressed in the manner already directed.

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After

After the contents of an hernia are reduced, either by pressure, or by the operation, it becomes an object of the utmost importance to prevent the disease from returning; but unfortunately this is one of the maladies which scarcely admits of a radical cure, though many have made pretensions of this kind, to the great detriment of those who have put confidence in them.

The radical cure, as it is called of *herniæ*, has been attempted, not only by quacks, but practitioners of great eminence; though attempts of this kind have now been always found to prove abortive. The method by which they proposed to effect this cure, was, either by destroying the sac altogether, or procuring such an accretion of its sides as would effectually prevent them from ever yielding to the pressure of the intestines, however great. For these purposes, various and very cruel methods have been invented. Even the actual cautery has been employed to destroy the sac, as well as the knife and potential cauteries; others have attempted to produce an accretion of the sides of the sac by a needle and ligature in the following manner. Having reduced the intestines, and divided the integuments with a scalpel, to bring the sac into view, they passed a gold wire round the upper end of it, including also the spermatic vessels in the noose; after which the wire was
twisted

twisted to such a degree, as was judged sufficient to prevent a return of the intestine, though not to interrupt the circulation in the spermatic cord. This they called the *punctum aureum*, or royal stitch; but, from what has been already related concerning the force with which the bowels press downwards in patients subject to hernia, it must be evident that all methods of this kind must be totally insufficient to prevent a relapse; nor indeed could any thing short of the destruction of the abdominal ring itself be efficacious. Hence it has been found, that, even when the actual cautery has been employed in the most severe manner, and the patient burned even to the bone, it did not prevent a relapse. Hence more modern practitioners, chiefly of the empiric stamp, have improved, as they imagined, upon this method, by destroying not only the sac, but the spermatic cord and testicle also. This is accomplished by passing a strong ligature round the sac and spermatic cord, drawing it so tight, that not only the passage through the sac is shut up, but all circulation through the parts below the ligature is interrupted, whence both cord and testicle are destroyed. In some cases the inflammation induced by this mode of treatment has arisen to such an height, as to destroy the patient; and, even where this was not the case, it has been found inadequate to the end proposed.

proposed. Such a thing, however, as a radical cure of an hernia, is certainly possible in nature; as a case has already been related, where a person in the decline of life, after being afflicted with a scrotal hernia for twenty years, was radically cured without any assistance from art. The same change that took place in his body by nature, might possibly be induced by art, provided we knew what it was. In all probability, indeed, it could be no other than an accretion of the sides of the hernial sac at the upper part; and indeed the patient himself seemed to be of opinion, that, for some time past, the opening through which the intestine descended had become gradually smaller; for the fits were not only very severe, but the reduction of the intestine, at the time it went up, was performed with evident difficulty, as if forced through a passage which could scarcely admit it to go through. None of the modes of practice recommended by former surgeons, however, could accomplish the purpose; because the pressure could not be made strong enough to produce an accretion, without destroying the blood-vessels, nerves, and, in male subjects, the spermatic cord, and bringing the life of the patient in danger; to avoid which the following method seems eligible. Having reduced the hernia, make an incision into the integuments, in such a manner as

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to lay bare the hernial sac; then dissect off from this the cellular substance, and separate it from the blood-vessels, spermatic cord, nerve, &c.; so that you may have free access to the sac by itself, dissecting it from the under part upwards; tie a ligature so tight, only about the upper part of it, immediately at the under edge of the ring, or neck of the sac, as to press the sides gently together; cut off the loose part one inch below the ligature, an inflammation and accretion will then take place between the two sides of the sac, as in other parts of the body; and this will also be communicated to the peritonæum within the abdomen, so that it will adhere to the muscles, and never elongate after; and thus there is a probability of the hernia being radically cured. I cannot as yet indeed recommend this method from actual practice, but it seems to be founded in reason, and is certainly well worth the attention of surgeons.

As the desirable method of accomplishing a radical cure in herniæ, is not yet discovered, the only thing that can be recommended, with certainty of success, is a properly made truss, capable of opposing the convulsive efforts of the abdominal muscles, by which the intestine is forced out. These ought always to be of the steel-spring kind; for, if made of any kind of soft materials, they cannot be depended upon; they may be used with safety even upon infants.

In

In the application of these, it is absolutely necessary that the pad of the truss should be well adapted to the part, or there will be danger of a portion of the intestine slipping down by the side of it; in which case, the pressure of the truss would not only produce intolerable pain, but other very dangerous symptoms. Certain circumstances may also render it requisite, in some instances, to depart from the rules usually laid down for the application of them. Mr Gooch mentions two instances of this kind. One of them was a gentleman of upwards of eighty years of age, who had long been afflicted with a rupture, attended with an hydrocele of the tunica vaginalis, and had trusses of the ordinary kind made for him, not only in the city near which he lived, but at London and Paris. Some of these, we cannot doubt, were made with sufficient accuracy; yet, with every one of them, the intestine frequently slipped down. On strict examination of the parts, it was found that this proceeded from a thickness of the spermatic cord, on one side of the abdominal ring, by which the action of the pad of the truss was impeded. It was evident, that nothing could be done in this case, but by having a pad of proper dimensions to enter and fill up the orifice accurately; as, by moderate pressure with the
I thumb,

thumb, the impulse of the intestine could be effectually resisted in the efforts of coughing, &c. To accomplish this, Mr Gooch caused a truss-maker, who had not succeeded before, to fix such a pad, with a screw, in the center of a much broader surface, to confine it more effectually, and made very soft and easy; which contrivance was always found to answer perfectly well, when properly adjusted and kept in the aperture. The other case was that of a gentleman between seventy and eighty years of age, who had a descent of the intestine on each side, which would not yield to a common truss, on account of the extraordinary thickness of the parts; though one, formed upon the principles just mentioned, succeeded extremely well. In both cases particular attention was paid to give such a degree of concavity to those parts of the truss to which the pads were affixed, as might cause them rest steadily and easily. Plate 3. fig. 3. 4. show the forms of trusses most proper for the scrotal, inguinal, and femoral herniæ. In those of the more uncommon kind, the workman must exercise his invention according to the circumstances of the case.

SECTION I.

HERNIA CONGENITA.

THE hernia congenita differs from the other, in having the intestine in contact with the bare testicle, the tunica vaginalis of the testicle being then the hernial sac. This happens by reason of the early descent of the intestine, before the mouth of the tunica vaginalis is shut up, or even before the testicles have fallen into the scrotum ; a circumstance, which, though by no means uncommon, has not, till of late, been observed by writers on surgery. The hernia congenita is not to be distinguished by any external signs from that already described. When a rupture appears in very early infancy, however, we may always, with tolerable certainty, suppose it to be of this kind ; but, in an adult, there can be no other reason for supposing it to be so, than his having had it from his infancy. In very young children, indeed, as has just now been observed, the intestine or omentum may descend before the testicle has left the groin, or even while it is yet in the abdomen. In this case, the application of a truss must

must evidently prove injurious, as it would prevent the descent of the testicle altogether, and by its pressure occasion violent pain, as well as other disagreeable symptoms. These ought, therefore, never to be applied to infants troubled with ruptures, unless the testicle can be felt in the scrotum after the contents of the hernia are reduced. In old ruptures of this kind, the intestine is subject to stricture, not merely from the pressure of the abdominal ring, but also from contraction of the neck of the sac itself; and may therefore require the opening of the sac itself, in the manner which has been already described. In performing this operation, however, it is necessary to take notice, that, as the testicle is laid bare by the opening of the tunica vaginalis, it must be treated with great gentleness, as being a part extremely irritable, and extremely susceptible of inflammation. Mr Pott informs us that he twice saw such a collection of fluid in the sac of an hernia congenita, with such adhesions of the internal parts, that the tumor was mistaken for an hydrocele. Had a puncture been made in these cases and the point of the lancet hastily introduced into the sac, perhaps even fatal consequences might have ensued; but, from his own experience, Mr Pott assures us, that the sac of a congenial hernia is very seldom, if ever, distended to such a degree

as the common hernial sac; and, by reason of its confinement by the upper part of the spermatic process, generally preserving a pyriform figure; whence it requires more attention and dexterity than the common kind in laying it open. There are more frequent adhesions and connections of the internal parts of a congenial hernia with the sac, than in any other kind, and there is one particular connection peculiar of itself, viz. that of the intestine with the testicle, which sometimes occasions a great deal of trouble; and therefore requires the utmost care as well as dexterity in the surgeon during the operation.

SECTION II.

THE EXOMPHALOS, OR UMBILICAL HERNIA,

Is a term applied not only to such herniary tumors as appear at the navel, but all along the linea alba, between the two muscoli recti. Those which appear at the navel, however, are generally larger than such as are met with along the linea alba, for this reason, that, at the navel the parts are covered only by the peritonæum, but, in other parts, both by the peritonæum and the aponeurosis of the recti muscles,

as well as the tendinous expansions of the others forming the linea alba. The exomphalos, however, is much less frequent than either the scrotal or inguinal hernia; probably, because the action of the diaphragm, united to that of the muscles of the abdomen, forces the bowels downwards. Pregnant women are particularly subject to the exomphalos, on account of the size of the uterus which bears up the bowels, and, by preventing their descent, forces them farther out. It has likewise been observed that some women, both when pregnant, and at other times, complain of a slight but almost continual cholic, which, upon examination, has been found to proceed from small umbilical herniæ, of which no notice was taken. The parts protruded in the exomphalos are generally the omentum, jejunum, and colon. When the jejunum is the intestine protruded, it lies behind the omentum; but, if the colon happens to be protruded, the omentum is not found exactly in that situation. Where the exomphalos is of long standing, the quantity of omentum found in the sac is sometimes surprisingly great, as is also the length of intestine; for, Mr Ranby informs us, that he has found two ells of intestine in the sac of an umbilical hernia. The other viscera are likewise sometimes found in hernial sacs of this kind, as the stomach, and even

even the liver. In ruptures of this kind, where the quantity of intestine protruded is very great, and the disease of long standing, the sac is sometimes ruptured by the weight and pressure of its contents; whence some have been in doubt whether the umbilical hernia has a sac or not. In some cases the contents of the sac may be easily reduced, but in others this is altogether impracticable; and, of the latter, some have been suspended in a bag for a number of years, without giving the patient any trouble. It is common, however, for those, who are advanced in years, and have the misfortune to labour under an exomphalos, to be also troubled with frequent vomitings, as well as colics and diarrhœas; so that they must at all times be very cautious in their diet, and be careful neither to eat nor drink any thing capable of offending or irritating the alimentary canal.

Infants are very much subject to umbilical herniæ, and it is of great consequence to cure them during the time of infancy, especially if they be females; as, during the time of pregnancy, the umbilical herniæ frequently occur in those who have not been subject to them before, and, if the disease has been of long standing, it is then particularly troublesome. It is seldom that umbilical herniæ are formed on a sudden, like the other kinds. They generally increase gradually;

gradually; and, when we find symptoms of strangulation attending an umbilical hernia, we generally find, at the same time, that the disease has been of long standing.

With regard to the cure of an exomphalos, it can only be by reducing the parts, either by pressure, or by an operation, in the manner already described, and the return of the disease prevented by a proper bandage, such as represented Plate 3. fig. 5. As for the radical cure, it has been attempted on plans similar to those proposed for other herniæ, but without success; and indeed, as here the bowels are often found protruded without any sac, even the method I have suggested concerning the possibility of radically curing the other kinds, must here be attempted with little probability of success.

SECTION III.

VENTRAL HERNIA.

WHEN an herniary tumor appears in any other part of the belly, it is called a *ventral hernia*, and proceeds from some relaxation of the common integuments of the abdomen, by which the intestines are allowed to protrude through
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the weak place. These herniæ are always included in a sac, formed by the dilatation of the peritonæum, and are not usually attended with any disagreeable symptoms, unless where the quantity of intestine protruded is so great as to become troublesome, by drawing the rest out of their places. Of this, M. Le Dran gives an instance of a young woman, who was very fat, and in whom such a relaxation had taken place, that from the viscera being deprived of their necessary support, she could neither sit nor stand, but was obliged to lie constantly in an horizontal posture. There is one particular species of this disease, however, which must certainly be attended with very serious consequences, and this is when one of the recti muscles happens to be injured in such a manner that the intestine may be intangled among the muscular fibres; in which case, the tendinous sheath strangulates the intestine, and produces all the bad symptoms of other herniæ. This kind of hernia is the more dangerous, that it is scarcely visible, on account of its lying so deep, and has therefore been sometimes mistaken for the cholic, named *miserere*. The cure of this can scarcely be attempted by pressure, on which account, the surgeon must proceed immediately to an operation in the following manner. The patient being laid upon his back, with the breast and knees somewhat elevated,

elevated, an incision is to be made through the skin, exactly upon the swelling : the skin and fat being afterwards divided, a small opening is to be made in the aponeurosis, with which the rectus muscle is covered. A directory must next be introduced, and the incision, by its means, enlarged both above and below ; and lastly, you must very cautiously cut into the body of the muscle itself, as the intestine lies between its fibres, until the opening be sufficiently large to admit of the intestine being reduced. After the wound is healed, the patient must constantly wear a bandage and bolster over the part, to prevent a return of the disease.

The protrusion of the urinary bladder, in an herniary sac, though less frequent, than that of the intestines or omentum, is yet a case not very uncommon. It passes through the opening in the oblique muscle, or through Poupart's ligament, as in the inguinal and crural hernia. It differs from these, however, in having no sac ; which arises from its being only covered in part with the peritonæum, so that it must insinuate itself between that and the oblique muscle, in order to get through the opening of the muscle, and thus form the hernia. Sometimes it is complicated with a bubonocèle, in which case, the protruded portion of the bladder lies between the intestine and spermatic cord. It may sometimes be the cause of an hernia of the intestine, by dragging

ging after it the peritonæum, which thus forms a sac for the reception of part of the contents of the abdomen. If an operation happens to be necessary, great care must be taken not to wound the bladder, which might, by an inattentive operator, be mistaken for an hernial sac. Sometimes it puts on such an appearance, that it may be taken for an hydrocele, and, if treated as such, the consequences must undoubtedly be fatal. When the disease has been of long standing, the patient cannot discharge his urine, without lifting up the scrotum and compressing it. In this case, an adhesion takes place between the bladder and cellular substance of the scrotum, so that a suspensory bandage is all the remedy that can be applied; but, when recent, herniæ of this kind may be easily reduced, and are then to be kept up by a proper bandage.

Among the more uncommon kinds of herniæ, are those in which the uterus is protruded. This has been observed by Ruysch; the uterus being even protruded in an impregnated state. The same author has likewise observed the spleen wholly protruded through the ring of the oblique muscle; and Mr Pott tells us, that he has seen the ovaria cut out of the groin after they had remained there for some months. No particular direction can be given for these extraordinary cases; only, that the operation, which, at
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all times, must be performed with great caution, requires here the utmost attention and skill of the surgeon, who must be guided by circumstances, both to discover the case, and how to act. As for the hernia of the foramen ovale, I do not think that there is a well attested instance of its having ever happened, except in one case, and I do indeed hardly believe, from the anatomy of the parts, that it can be a frequent occurrence.

CHAP. VIII.

OF THE HYDROCELE.

By this term we understand any collection of water in the scrotum, whether its seat be in the common integuments, or in the coats with which the testicles are immediately invested.—The former, indeed is for the most part only the consequence of another disease, *viz.* an anasarca of the whole body; though instances have been met with of an anasarca of the dartos confined to one side, which showed the disease to be truly local. Examples of this kind, however, are very

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rare,

rare, and we ought by no means to confound the two diseases together ; for, by doing so, many dangerous errors have been propagated. Some from a notion that the extravasated fluid in hydrocele was always the consequence of a dropfical habit, have prescribed in all cases strong purgatives and diuretics ; nay, some have made use of actual cauterics, and made ligatures and incisions upon the spermatic vessels, and in the groin, to hinder the water from descending to the scrotum from the belly ; and to complete their absurdities, castration itself has not unfrequently been made use of, from a supposition that the testicles were spoiled by lying long in the water.

In the hydrocele, however, it is certain, that no anasarcaous collection of water in the dartos can be derived from the cavity of the belly, any more than the swelling of the legs or feet, in an anasarca or ascites, can be derived from that cavity. It is entirely confined to the cellular membrane, which lies on the outside of the peritonæum, and discovers itself by an equal soft tumor, occupying every part of the cellular membrane which envelopes the testicles, leaving the skin of its natural colour. If the quantity of water be not very large, the skin preserves some degree of its natural wrinkled appearance, and the tumor feels somewhat doughy, retaining

retaining the impression of the fingers upon it. But, when the quantity of water is very large, or the disease of long standing, the skin is then smooth, tense, and transparent, the tumor is cold to the touch, does not so long retain the impression of the fingers, and is always accompanied with a similar distention of the skin of the penis; the prepuce being thus sometimes distorted in such a manner as to make a very disagreeable appearance. In this stage of the disease, it is also frequently accompanied with loss of appetite, a yellow countenance, swelled legs, tension, and hardness of the belly, scantiness of urine, and mucous stools. Sometimes the penis and scrotum are distended with water to such a degree, that they are in danger of mortification; and it becomes absolutely necessary to relieve the patient by letting out the water. For this there are two general methods, *viz.* punctures with the point of a lancet, or incisions of considerable size, made with an instrument of the same kind. Of these, the former is to be preferred; as large incisions are sometimes apt to produce inflammation, and mortification, in anasarctous habits, while simple punctures easily heal up, and can be renewed with very little pain, as often as there is occasion. The small punctures are besides equally efficacious with the incisions; for, as all the cells of the dartos communicate
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with each other, the water drains off even when the most superficial of them are wounded, as well as though incisions were made ever so deep. It must be observed, however, that neither puncture nor incision can be supposed to do any thing farther than alleviate the symptoms; though sometimes, by accident, they have produced a radical cure; but, in by far the greatest number of cases, this can only be accomplished by a course of medicine.

Leaving any farther consideration of the anafarcous hydrocele, therefore, we shall now proceed to consider,

SECTION I.

THE HYDROCELE OF THE CELLS OF THE TUNICA COMMUNIS.

This disease may be produced either by a rupture of the lymphatic vessels, pressure upon them by indurations in the cavity of the abdomen, or a diseased state of those vessels which receive the lymph from the spermatic cord. It is not very common, and has been frequently mistaken for a varix of the spermatic cord; for it has its seat in that membrane called *tunica communis* which is entirely cellular, without any particular cavity;

cavity; the cells, while in the inside of the abdomen, being large and lax, but when it passes out, becoming smaller, and being included within what is called the cremaster muscle. This kind of hydrocele does not affect the dartos or tunica vaginalis, which is the reason of the mistake just mentioned concerning its nature, as well as that it has been taken for the descent of a portion of omentum, which could not be returned on account of an adhesion.

While this hydrocele is of a moderate size, the scrotum remains free of every appearance of disease; only that, when the skin is not corrugated, it seems rather fuller, and hangs lower on that side than on the other; feeling also heavier, if suspended on the palm of the hand; but, below this fulness, we may feel the testicle and epididymis in their natural state, without the least alteration; but the spermatic process has the feel of varix or omental tumor, and on pressure seems to go up or recede a little, though it presently returns again on removing the pressure, whatever be the posture of the patient. It is attended only with a very slight degree of uneasiness in the loins. In this disease, when the cellular membrane which invests the spermatic vessels within the abdomen is affected, the tendinous aperture through which they pass is likewise

wife enlarged, and the distended membrane feels very like an omental hernia.

This species of hydrocele is scarce an object of surgery, unless it happens to arrive at a very considerable height, and then, as the cure cannot be accomplished without a large incision, it is always attended with very great danger. When the tumor has arisen to such a size, that it becomes absolutely necessary to attempt something for the patient's relief, we must make an incision from one end of it to the other, which incision must be of a depth sufficient to evacuate the whole of the water contained in the cells of that part; and this incision must be the deeper as the water is often of a viscid nature. The wound is then to be treated as any other; applying poultices and fomentations in case of much pain, and applying the usual remedies to promote suppuration. Mr Pott gives an instance of a gentleman afflicted with an hydrocele of this kind, in which eleven pints of water were evacuated from the scrotum at once, without any reduction of the size of that part in proportion to the evacuation. In about a month it was again augmented to its former size. An incision was made the whole length of the scrotum, the lower part of which had been formed into a cyst, or bag, made by the pressure of the water, which was discharged on the first introduction of the knife.

knife. The rest of the tumor was formed by serum disposed through the whole structure of the tunica communis, its cells being all very much enlarged, quite up to the groin ; the testicle was very distinct, and free from any kind of disease ; but, by gentle pressure, the serum oozed freely from all parts of the membrane just mentioned. This discharge continued very plentiful, the wound being neither inflamed, nor having any tendency to suppurate ; the patient, in the mean time, being afflicted with thirst, and becoming daily more and more languid, so that he died in about fourteen days, from the last operation, without the least appearance of gangrene, inflammation, or mortification in the wound. On opening the body, all the cellular membrane investing the spermatic vessels within the abdomen, was found loaded with water, and very irregularly distended from the origin of the vessels quite down to the opening of the oblique muscle ; and here it was contracted into a round, or rather flattish kind of body ; though still of size sufficient to dilate the opening considerably. The cells below this were again expanded and dilated considerably with water, but the testicle and tunica vaginalis were quite sound. Mr Pott is of opinion that this patient died merely from the profuse discharge of serum ; there having been neither digestion, nor inflammation of
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the wound ; nor any thing like gangrene, or sphacelus, and his manner of dying being very like those who die from profuse hæmorrhages.

In some cases, the water collected in the tunica communis, instead of being equally diffused through the cells, is contained in cysts ; sometimes in one large bag resembling the bags of encysted tumors in any other part of the body. This is termed the *encysted hydrocele*, and is a complaint by no means unfrequent in children. Ancient writers have described it very accurately, but some of the moderns have mistaken it for an imaginary disease, called a *pneumatocele*, or *wind rupture*. The reason of this mistake seems to have been, that the tumor, whether large or small, is always considerably tense, and the fluctuation of the water in it not easily perceptible ; it does not retain the impression of the fingers ; and, when struck upon, sounds as if it only contained air.

The encysted hydrocele commonly occupies the middle part of the process between the testicle and groin, being commonly of an oblong figure, and thought by some to resemble the bladder of a fish. It is always perfectly circumscribed, and has no communication with the cavity of the belly or the vaginal coat of the testicle ; and both the testicle and its epididymis may be

distinctly

distinctly felt below this swelling as in the former; and the upper part of the spermatic process in the groin is commonly very easily to be distinguished. It is not in the least altered by any change of posture in the patient, nor is it affected by the coughing or sneezing of the patient; which is not the case in the other kind; for in the case of the gentleman already quoted, the whole tumor was manifestly distended when the patient coughed. Sometimes the swelling is first perceived in the upper part of the process, but generally towards the lower extremity, a little above the epididymis. By degrees, however, it advances upwards, and generally proceeds also downwards, so far that it reaches from the abdominal muscles to the bottom of the scrotum; so that it may easily be mistaken for a dropsy of the tunica vaginalis; but in the latter, the figure of the penis is more altered, so that it sometimes disappears entirely; which is not the case with the kind we speak of.

Sometimes it happens that this complaint is combined either with a true hernia, or with an hydrocele of the tunica vaginalis; in either of which cases the appearances must be different, according to circumstances. To find out those diseases with which the encysted hydrocele is combined, we must carefully consider those to which the parts are naturally liable; and these,

as has been just now mentioned, are the hydrocele of the tunica vaginalis, and the true hernia. One mark of the former is, that it distends the inferior part of the scrotum; and, as the testicle is nearly, though not altogether surrounded by water, it is seldom that it can be plainly distinguished by the fingers, but in the encysted hydrocele it may be felt very evidently. We must likewise remember that in an hydrocele of the vaginal coat, different parts of the tumor feel very differently. In all those parts, for example, where the tunica vaginalis is loose and unconnected with the tunica albuginea, the swelling is soft, compressible, and plainly discovers the fluid it contains; but, when these are continuous, or make one and the same membrane without any cavity between them, (as is the case on the middle and posterior part), we find a hardness and firmness, unlike what is to be met with in other places where room is left for a fluid to collect between the coats; but, in the hydrocele of the tunica communis, the tumor feels like a distended bladder, and equally soft through every part. From an intestinal hernia we may easily distinguish this kind of hydrocele, by the free state of the upper part of the spermatic process while the tumor is forming below; by the gradual accumulation of the fluid; the indolence of the tumor, and the impossibility of reducing it,

it, even from the very first ; its being always unaffected by the coughing or sneezing of the patient ; and from there never being any interruption of the intestinal discharge. Sometimes indeed an encysted hydrocele has been observed, situated so far up towards the groin as to render very obscure, or even imperceptible, any feeling of the spermatic vessels ; but in this case the state and appearance of the testicle, and the absence of every symptom proceeding from strangulation of the intestinal canal, sufficiently showed the true nature of the complaint.

Infants, as we have said, are much more subject to this complaint than adults ; and, when very young, it frequently goes off in a short time. When the disease is first observed, it will be proper to keep the belly open, and to apply fomentations ; but, if it do not disperse in a short time, it will be necessary to discharge the water by the puncture of a lancet. This, in young subjects, will most commonly affect a cure, but, in adults, the cyst sometimes becomes so thick that it must be laid open through the whole length ; but this operation, though so slight in appearance, is yet not unfrequently attended with very troublesome and even fatal consequences, arising from the affection of the nervous system by wounds in membranous parts in some particular habits. Of this Mr Pott gives an instance in a man about 40 years

years of age, whose disorder had been brought on by fatigue and a fall over his horse's neck in a fox-chace. When he applied to Mr Pott, the groin and all the upper part of the scrotum was large and full; but the testicle very easily felt, and distinct from the tumor. He constantly felt a dull kind of uneasiness in it, and it was very troublesome when on horseback, which he was often obliged to be, as his business was that of a huntsman. He had, for some time, worn a truss, by which the part was rendered uneasy; he had used strong liquors freely, his countenance was yellowish, and his legs somewhat swelled. At this time Mr Pott did not think it adviseable to perform any operation upon him, but desired him to follow the advice of a physician in the country which he had done for some time past. In three or four months he returned apparently in better health, and the operation was performed by making an incision the whole length of the tumor. Thus a considerable quantity of water was discharged, and for three days the serum continued to flow plentifully, but the wound neither swelled nor became inflamed, his pulse was hard and frequent, he was troubled with thirst, and had a languid countenance. No cordials which could be given were of any avail, the lips of the wound constantly remained cold, and the edges of it at last turned livid. He be-
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came delirious on the seventh day, and died that evening.

SECTION II.

HYDROCELE OF THE TUNICA VAGINALIS.

In an healthy state of the body there is always a small quantity of fluid found in the cavity of this tunic. It exhales from the capillary arteries, and the superfluous quantity is absorbed by vessels appointed for that purpose; that which remains being of use to prevent the tunica albuginea and vaginalis from growing together; but when by any means the absorption is prevented, an accumulation naturally takes place. This may happen at any time of life; nay sometimes children are born with it. We are not as yet able to determine with certainty the cause of this disease; though as in it the spermatic vessels are very often found varicose, Ruyfch has conjectured that such a state of these vessels produces the disease. In general we are certain that whatever causes prevent the due absorption of the liquid above mentioned, must likewise produce this kind of hydrocele; and, when these causes operate with
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great violence, as in the case of bruises and hurts, the disease will come on very suddenly, and increase to a great bulk in a very short time.

The hydrocele of the vaginal coat, when produced by any internal cause, discovers itself by a fulness about the inferior part of one of the testicles, the parts growing gradually more tense as the disease advances; and the shape of the tumor itself changing from globular to pyramidal. At first it is soft and compressible, but cannot by any means be made to disappear entirely; and, as the disease advances, it proceeds gradually upwards even to the abdominal muscles, so that the spermatic process cannot at all be distinguished. It is not attended with any pain, unless very large, when the weight of the tumor, occasions a slight pain in the back. When the tumor has arrived at any considerable size, the skin of the neighbouring parts is dragged along by it to such a degree, that the penis disappears almost entirely; and in this state of the disease the testicle cannot be felt without much difficulty. The transparency of the tumor has been generally supposed to be the principal characteristic of this kind of hydrocele; but, it is evident that this must depend entirely on the nature of the contents, or the thickness of the sac; so that though the transparency of the tumor is a certain sign of the existence of water, its opacity can by no means be accounted

accounted an indication of its absence. The fluid contained in the vaginal sac is not always of the same colour ; in some it is of a straw colour, in others greenish, and in some turbid and dark coloured or bloody ; while in many it is quite pale and limpid.

As this species of hydrocele is apt to be mistaken for some other diseases, it is of some consequence to point out the methods by which it may be certainly known. The disorders with which it has been confounded are common herniæ of the scrotum ; anasarcaous swellings of the same part ; the hydrocele of the spermatic cord ; scirrhus testicles, and the hernia humoralis. From the first of these, it is easily distinguished by the total absence of all those symptoms which attend the strangulation of any part of the intestinal tube, and from the swelling ascending gradually from the bottom of the scrotum, while the true hernia always descends suddenly. Anasarcaous swellings distinguish themselves so evidently, that none but mere novices can mistake any of these for an hydrocele of the tunica vaginalis. The way in which it may be distinguished from the hydrocele of the spermatic cord has been already explained ; so that we have now only to point out the means of distinguishing the hydrocele of the vaginal coat from the disorders of the testicles themselves.

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In the hydrocele we speak of the tumor, though sometimes considerably hard and tense, is yet always much softer than in the scirrhus testicle; for the latter does not in the smallest degree yield to the pressure of the fingers, and is likewise rough and unequal, contrary to the nature of the hydrocele, which is always smooth and equal. It may also be distinguished from a scirrhus, by its being much lighter in proportion to its bulk. In some cases, however, there is a combination of a hydrocele of the vaginal coat with a scirrhus testicle, when the disease is termed *hydro-sarcocele*, and it is very difficult, nay sometimes, impossible to distinguish it properly.

The hernia humoralis, or inflamed testicle, is generally owing either to a venereal cause, or to some bruise or other accident. But in this the inflammatory redness of the skin, the hardness of the tumor, extreme pain in it shooting up to the abdomen, and its want of fluctuation, or any other sign of the contents being fluid, evidently point out the difference between it and the hydrocele of the vaginal coat.

The cure of this hydrocele depends very much upon the constitution and habit of the patient, as well as upon other circumstances; so that in some it is only possibly to palliate, while in others a perfect and radical cure may be accomplished.

plished. The palliative cure consists merely in letting out the water, without making any attempt to prevent its return, and may be done at any time of life, or almost in any habit of body. The instruments proper for performing the operation are either the common lancet or trocar; but the latter seems preferable, as by means of its canula we may be sure of evacuating the whole of the water, while the former almost certainly leaves some behind; so that even the temporary advantage, which might otherwise be expected from this operation, will not be obtained.

The proper place for making the puncture is known from the anatomy of the parts. It must be considered that the testicle does not hang loose in the middle of the vaginal coat, but is attached to some part of it. The anterior parts are detached from the tunica albuginea; but the posterior and lateral parts are united to it; so that there is no cavity between them where water can be collected in that part. In the most dependent place of the forepart, therefore, where the two coats are at the greatest distance from one another, the puncture ought to be made; for if it is done in any other part, the consequence must be a division of the testicle itself, which cannot but be attended with the most vio-

lent pain, and even sometimes with fatal consequences.

Some have objected to the letting off the water in this kind of hydrocele while the quantity was small ; but, for this, there cannot be any good reason, if we can preserve the testicle from being wounded by the instrument ; and there is besides much more probability of the fluid not being collected again, if the operation is performed, while the disease is recent, and the vaginal coat not much injured, than when it has been prodigiously distended by an immense quantity of fluid, and thus becomes thick, tough, and tense, as all other membranes do by such long and preternatural distension. Mr Pott is of opinion, that, by early letting out the water, the disease might sometimes be radically cured. But, before even this operation is performed, it will always be proper to try what can be done by proper applications, if there be any appearances of inflammation ; and Mr Pott gives three instances of the bad effects of neglecting this. The first was a gentleman upwards of sixty years of age, of a corpulent full habit of body, somewhat asthmatic, and subject to a kind of irregular gouty inflammation, which at times affected various parts of his body. There was at the time he saw him something of an inflammatory appearance on the right side of
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the scrotum where the disease was. On account of these unfavourable symptoms, Mr Pott advised him to delay the operation till he should get free of the symptoms of inflammation which then appeared; but this not being complied with, a puncture was made immediately, and near a quart of greenish fluid taken off by the trocar. The patient took no care of himself after the operation was performed, but walked about that day; and not only did the same the day following, but took off the truss which had been put upon him, and drank freely. In consequence of this he was attacked by severe feverish symptoms, which ended in a mortification of one half of the scrotum, and almost the whole tunica vaginalis. In about ten days from the first attack, the mortified parts cast off, the gout returned to his feet, and he soon got well; but, notwithstanding the large portion of the vaginal coat cast off, which seemed scarce to leave any remaining, the disease returned, and Mr Pott drew off, twice afterwards, a full pint of water from the same side.

In this case perhaps the bad symptoms which took place might be ascribed to the obstinacy and irregularity of the patient himself, but the two following are liable to no such objection.—A man of about forty years of age, who had been long afflicted with an hydrocele of the tunica vaginalis,

vaginalis, having been robbed by a servant of a considerable sum of money, was obliged to ride very hard from Exeter to London. By the time he arrived at his journey's end, the scrotum (which had been free from all disease except the distension by water), was all covered with an eruption of the erysipelatous kind, very painful, and much increased in size. At night he had a shivering, which next day was followed by a considerable degree of fever; and in the morning his scrotum was so much inflamed that he sent for assistance. The person who came instantly evacuated the water, but without the smallest relief, for by night the whole scrotum was mortified, so that Mr Pott found it then impossible to be of any service to him, and he died next morning. "Now, (says Mr Pott), though it be very possible that the same appearance and event might have ensued if no puncture had been made, yet I think it is very clear that it would have been prudent first to have tried what a soft cataplasm, and an antiphlogistic method could have done. For, by making the opening hastily, and without a proper prognostic, the operator, whether deservedly or not, incurred all the blame."

The third case was a poor patient in St Bartholomew's Hospital, whose scrotum was not only inflamed to the highest degree, but in one place
seemed

seemed inclining to sphacelate; and the spermatic process was also considerably thickened. He had also several other bad symptoms, all of them the consequence of ill treatment he had met with from quacks, one of whom had attempted to draw off the water; but the wound he made was followed only by a discharge of blood, which did not stop till the patient fainted. As soon as this patient was brought to the Hospital, it was determined to put him on the antiphlogistic course, in order to alleviate the violent inflammatory symptoms; and he was accordingly bled, glystered, and had the scrotum wrapped up in a warm soft poultice, and tied up in a bag-truss. An opiate was given as soon as he had a stool, and repeated every six or eight hours; but notwithstanding all that could be done, the patient continued in the same way for three days, before any alleviation of the symptoms could be perceived. When this at last was procured, the water was drawn off from the fore part of the tumor, after which the testicle appeared very much enlarged and hardened; either it or the epididymis having been wounded by the quack who attempted formerly to draw off the water; but by a perseverance in the antiphlogistic method for some time longer, the patient at last got well.

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With regard to the radical cure of the hydrocele, it seems not to be altogether impossible even without any operation, and Mr Pott gives two instances of its having taken place naturally. The one was of a gentleman about forty-five years of age, who consulted him about an hydrocele which had not at that time arrived at any great height, and which for that reason he would not allow to be tapped. At the end of six months he returned, with the swelling greatly enlarged, and would then have allowed the operation to be performed, had not some urgent business called him away for a few days into the country. Here he was seized, for the first time, with a regular fit of the gout, which confined him to bed for six weeks; and during this time the swelling of the scrotum totally disappeared, without ever returning. The second case was of a middle aged man, who had an hydrocele of two years standing, which he consented to have tapped, and the next morning was fixed for the operation. In his way home, however, having got intoxicated, he fell down into the area of an empty house, and struck his scrotum against a piece of scaffolding. Next morning a great ecchymosis appeared under the skin of the scrotum, which was very much swelled, and very painful. Mr Pott, though contrary to his principles above-mentioned, pressed him to have the
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water drawn off immediately ; but as the patient would not comply, he was obliged to have recourse to fomentations, cataplasms, &c. By continuing the use of these, the ecchymosis, inflammation, &c. were dissipated in a fortnight ; and, at the same time, the tumor of the vaginal coat appeared to be considerably less. The same method was therefore persisted in for some time longer ; and in about three weeks the hydrocele totally disappeared, without ever returning.

In these cases, especially the second, it is impossible to conjecture how the disease was carried off, and therefore we cannot prescribe any medical course which might tend to produce the same effect in other cases. Recourse is therefore always to be had to an operation, and there have been many different opinions concerning the most proper mode of performing it. By the ancient surgeons the use of a seton, tent, canula, caustic, or incision, was proposed ; and, from a notion that the water descended from the belly, a ligature, with the use of cauteries, both actual and potential, has been proposed, together with injections of such a nature as was imagined capable of healing the divided lymphatic vessels. As the anatomy of the human body became better known, some of these violent remedies fell into disuse. The tent and canula were made use of on a supposition that the water had some
noxious

noxious quality, and that there was a necessity for performing the cure gradually, in order to make such a drain of the noxious tumors as might prevent the coming on of other diseases ; but though these are still used, it is now with a view to promote an adhesion between the tunica vaginalis and albuginea, that so the cavity in which the water collects may be entirely destroyed ; for on the destruction of this, depends the permanency of the cure. The destruction of this cavity, therefore, is the object which practitioners are to have in view ; and for this purpose it has likewise been proposed to destroy the vaginal coat entirely ; but this is now also found to be unnecessary, unless, in cases where a part of it has quite lost its tone, and is become very much thickened ; and even in these, will be found sufficient to remove only a small part of it. Some practitioners, however, still adhere to this method of destroying the vaginal coat ; and Mr Douglass, in order to do so effectually, recommends the cutting out an oval piece of the scrotum, after which, the vaginal coat is to be cut away by a pair of scissors. But, even if it should be thought eligible to follow this method, there is no occasion for cutting away any part of the scrotum, and a scalpel will remove the vaginal coat much better than a pair of scissors.

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The use of caustics has had many advocates, even among modern surgeons ; the general method of attempting a cure, by means of it, was to apply a piece of paste caustic, of the breadth of a finger, and the whole length of the tumor, after having shaved the scrotum ; after which, the tunica vaginalis was to be laid open by a scalpel, so that the contents might be evacuated, the testicle laid bare, and the wound properly dressed. But Mr Else, the latest writer who has proposed to cure the hydrocele in this way, is of opinion that there is no occasion for the application of such a large caustic, but that an eschar of the size of a shilling is every way sufficient. He proposes, therefore, to apply, to the fore part of the tumor a piece of caustic paste, of the size only of a sixpence, secured by a cut of adhesive plaster, to prevent it from spreading too much. In five or six hours, it may be removed, and an emollient poultice, with digestives, is to be applied ; the inflammatory symptoms must also be moderated, by blood letting, injections, &c. ; in a few days, however, the eschar of the scrotum separates ; in five or six weeks, the whole of the tunica vaginalis comes away, and the cure is completed by the cicatrizing of the wound.

But, from the account which this writer gives of his favourite method of cure, one would ima-

gine he thought it necessary to give his patients as much pain, and to bring them into as much danger as possible, before he cured them. If the intention is to excite only a moderate local inflammation, it is surely unnecessary to raise a high fever throughout the whole system, accompanied with such a degree of local inflammation as must endanger a complete mortification : But the worst is, that, after all, the cure does not appear to be certainly permanent ; for in one of these cases above quoted from Mr Pott, as large a portion of the vaginal coat separated spontaneously as we can ever expect to separate by Mr Elze's method, and yet the disease returned. Though a patient, therefore, might be advised to submit to a good deal of pain, and even to run some risk for the sake of a permanent cure, it certainly would by no means be proper to desire him to submit to it for an uncertainty ; we must, of consequence, conclude that the method of cure by caustic is never to be attempted.

Another method of cure, much more generally practised than the former, is that by means of seton. The end proposed by this, is not to destroy the vaginal coat, but, by the constant friction of the cord, to excite such a degree of inflammation as may make it adhere to the tunica albuginea. In this view, it is similar to the use
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of tents ; but these, whether of lint or sponge, are still more objectionable than the setons ; for, on account of the cellular texture of the dartos, and the loose connection of the skin with the tunica vaginalis, it is impossible to introduce a tent easily without a canula. After it is in, the effect is uncertain, and sometimes only a partial cohesion is produced. In the Medical Essays, we find a method proposed by the late Dr. Monro, of exciting the wished for inflammation, by leaving in the wound the canula of the trocar with which the wound was made for drawing off the water. “ By the extremity of it (says he) rubbing against the testicle, an inflammation might be artfully raised ; the cause of which, might be taken away as soon as the surgeon pleased,” &c. Such a method, however, one should think, must be exceedingly dangerous and uncertain ; as, by the least inattention of the patient, the testicle might be injured in a very dangerous manner ; though Mr Pott seems to have a good opinion of it, at least with an improvement of his own. “ This method, (says he), with some small alteration, I have used once or twice with success. Being afraid of the pain which might be occasioned by the extremity of the canula rubbing against the tunica albuginea, and the irritation in consequence thereof, I have left it in, but with a piece of
bougie

bougie (whose length exceeded that of the canula about a quarter or an eighth of an inch) within it. Of all the methods of using a tent, I think this is the best, as the canula secures its passage into the cavity of the vaginal coat, which the collapsing of the tunic, and the loose texture of the dartos, would otherwise render somewhat difficult. But, although, I have once or twice succeeded in this manner, I have much oftener been frustrated; sometimes it has proved absolutely ineffectual; and at others, I have seen it raise such a disturbance, as to render it necessary to lay the whole cavity open before a cure could be obtained. Of all the methods of obtaining a radical cure of an hydrocele, by exciting an inflammation within the tunica vaginalis, that by the seton is much the best," &c. In another part of his work, Mr Pott speaks of the canula and bougie in the following manner: "The canula, when used for the same purpose, instead of a tent, is indeed easily introduced; and, when it is in, does not confine the matter; but then, its hardness, inflexibility, and thin edge, and the absolute impossibility of directing and managing it in the frequent and necessary motions of the patient, though confined to his bed, render it a very troublesome guest within the tunica vaginalis; and if, to avoid this inconvenience, a piece of bougie be kept within it,

this,

this, while it is there, confines what ought to be discharged."

From all this we may conclude that the method of curing an hydrocele by a seton is the favourite plan of this celebrated surgeon; and he farther recommends it, by telling us that he has several times tried it on subjects of very different ages, some of them more than fifty years old; that it requires confinement to bed only for a few days; after which the patient may lie upon a couch to the end of the attendance, which is generally finished in three weeks, or a month at farthest; and, during all that time, no other process or regimen is necessary, than what in inflammation from any other cause, for instance an hernia humoralis, would require. In the performance of the operation, he makes use of a steel trocar, with a silver canula five inches long, and of such a size that it may easily pass through the canula of the trocar. He has also a probe six inches and an half long, with a fine steel trocar point at one end, and at the other an eye, through which is passed a cord of coarse white sewing-silk, but which must be sufficiently small to pass through the long canula above-mentioned. The anterior and lower part of the tumor is to be pierced with the trocar; and, as soon as the water is discharged, the small canula is then to be introduced, till the end of it

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is felt at the very upper part of the scrotum. The probe, armed with the seton, is then to be passed through the canula; the vaginal coat and the integuments pierced, and the seton drawn through till a sufficient portion of cord appears at the upper orifice; after which, both the canula and probe are to be taken away, and the cord allowed to remain in the wound. An inflammation comes on about the third day, when emollient fomentations and other proper methods are to be made use of to allay the symptoms, if they happen to be urgent. When the inflammation abates, which is commonly about the tenth or twelfth day, the seton must be diminished, by withdrawing six or eight threads at every dressing; no other application being necessary for the wounds but a pledgit spread with cerate or unguentum saturninum upon each.

In the introduction of this seton for the hydrocele, it will be proper, as in other cases, to begin at the upper part of the tumor, as in the evacuation of matter from the abscesses; but the method itself of curing this disease by setons is certainly exceptionable, for the following reasons. 1st, It very often, like the caustic, excites a very high degree of inflammation, in so much that suppuration sometimes takes place, and it is found necessary to open the scrotum,

in order to allow the matter to discharge itself. 2d, The water is very often contained in small bladders, forming what are called *hydatides* ; or it sometimes penetrates into the cellular substance of the vaginal coat, and is there detained ; in either of which cases, it is evident that it can never be drawn off by a seton. 3d, When a seton is made use of, we have it not in our power to examine, as it ought to be, the state of the testicle, which is very often diseased. And, 4th, It sometimes happens, in the course of the cure, that, from the high degree of inflammation excited, the seton itself adheres to the testicle ; on all which accounts I think we may safely pronounce this method of curing the hydrocele by means of a seton to be at least very painful and uncertain ; so that the best method still seems to be by incision.

To perform this operation properly, the whole of the tumor must be accurately shaved, and the patient must be laid on a table of a convenient height, or upon his bed, with the scrotum hanging quite freely over the edge. He is then to be properly secured by two assistants ; and the operator placing himself betwixt his thighs, lays hold on the posterior side of the scrotum, so as to make it somewhat tense on the anterior part. The skin and cellular substance are next to be divided with a round-edged

edged scalpel, at one continued cut, from the upper to the most inferior part of the tumor ; and, as the edges of a wound made in the scrotum contract very considerably, the vaginal coat is immediately and distinctly brought into view. An opening must now be made in this coat, with a lancet, large enough to admit the finger of the operator ; which opening ought never to be lower than two-thirds from the bottom. The operator must now introduce upon his finger the probe pointed bistoury, completely laying open both the upper and under part of the sac ; so that, if any part of the cure depends upon a full and free incision of the tunica vaginalis, it cannot be performed to more advantage than in the method just now recommended. The testicle, after the vaginal coat is laid open in this manner, will indeed always protrude, but must be replaced without delay ; and, unless the vaginal coat be very much thickened, so that it sticks out as it were beyond the lips of the wound, the operation ought to be finished immediately by dressing the part ; but, if the vaginal coat should protrude in the manner just mentioned, that part which protrudes ought to be removed by the scalpel, which a practitioner, who has a steady hand, may easily do, without the least danger of hurting the scrotum,

tum in dissecting away the edges of the thickened part.

If the hydrocele, as is sometimes the case, should affect both sides of the scrotum, it must be obvious to every one acquainted with the anatomy of the parts, that, by gentle pressure on the opposite side, the septum scroti will be pushed into the opened vaginal sac; an opening being made at the upper part of it by a lancet so large as to admit the operator's finger, and this being laid open to the bottom by means of the bistoury, with the finger as the director. Thus the whole of the water will be evacuated; and the testicle may, even in this way, be examined with accuracy. In three cases of this kind, one of which is afterwards related, I have followed the method just now recommended with the most perfect success; and shall only farther observe, that the prosperous event of the cure depends entirely on the method of dressing. The ordinary method is by introducing a piece of soft lint dipped in oil betwixt the vaginal coat and testicle, leaving one end of each piece completely out of the wound; but, if the other end does not quite reach to the bottom of the sac backward, as well as touch the extremity both above and below, it may very probably happen, that, after all our care, the parts of the vaginal coat which lie behind the dressings

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will be filled again with water, even before the wound already made be thoroughly healed. I have seen several examples of this kind, even where the operation had been performed by men of eminence in their profession, and yet there was a necessity for a second operation before the first was cured, in order to let out the water collected in the upper and back part of the sac.

This affection can only happen from not carrying the incision far enough downwards and backwards, so as completely to lay open the under end of the vaginal coat to the very back part of the scrotum, in order to discharge the whole of the water, and from filling the sac partially and unequally in the first dressing. A single ply of lint, dipped in oil, and applied on each side of the testicle, and the whole of the inside of the vaginal coat, will be sufficient; after which the edges of the wound may be dressed with pledgets of cerate, and the ends of the lint left out, and turned over on each side. Several pieces of soft lint are then to be laid over the wound from one end to the other. These ought to be more or less numerous, according to the warmth of the season; a small compress of linen being laid over the whole; after which they are to be properly supported by a bandage resembling the letter T, or a suspensory bag properly fitted. The patient is then to be

be put to bed, and desired to lie upon his back, and to move as little as possible for two or three days. An anodyne will be proper, especially if the pain is considerable; the sole intention being only to produce that moderate degree of inflammation which may cause an adhesion between the testicle and the whole tunica vaginalis; but, should the inflammatory symptoms run high, the usual means of blood-letting, &c. must be employed to alleviate them. Topical blood-letting is sometimes of use in these cases, and gentle laxatives are particularly serviceable. The patient must be kept on a low diet, and emollient poultices laid over the whole to promote suppuration; but, where no such distressing symptoms occur, the wound ought never to be looked at sooner than from four to six days after the operation, except in very warm weather, when it may be necessary to dress it a day or two sooner. The dressings will generally be by this time easily removed: But, if they should not, the obstruction may be overcome by a sponge dipped in warm water. It must be observed, however, that it is only of the external dressings we speak at present, for the lint interposed betwixt the tunica vaginalis and albuginea, in order to excite the inflammation, will continue to adhere firmly for some days longer; but, if the matter does not flow freely from it, or is produced only in small quantity,

quantity, an emollient poultice will be found greatly to promote the discharge. The suppuration, however, will, for the most part, be found complete in ten, twelve, or fourteen days; and, if the fore be properly dressed every day or two with a little cerate, the cure may be completed in five, six, or eight weeks, according to circumstances. The following cases will evince the propriety of the mode of operating above recommended, and likewise show that, not unfrequently, a radical cure may be effected by a simple incision of about an inch and a half in length in the most dependent part of the scrotum, without any lint being put into the cavity of the vaginal coat, but only by a free admission of external air into it.

J. M. aged about fifty-four, had been affected with an hydrocele on the left side of the scrotum for about three years. It had begun on the under part, proceeding gradually upward, and was transparent. The operation was performed by laying him on a table three feet and an half high, and making an incision from the top to the very bottom of the tumor, and even a little backwards, at one stroke of the scalpel. I then made an opening with an abscess lancet into the tumefied vaginal coat, about its middle, large enough to admit the point of the fore-finger of my left-hand. Up-

on this I introduced the straight probe-pointed knife, and laid open the vaginal coat to the uppermost extremity. Then turning my finger downwards, I with the same knife laid open the tunic to the bottom. The testicle appeared quite found, and a piece of caddice dipped in fine oil was put into the vaginal coat, as above directed, from one end of the tumor to the other; the sides of the sac were brought together upon this dressing, and the edges of the wound dressed with pledgets of cerate, and the whole covered with caddice, and a small compress of lint, a T bandage being put over all.

Though the whole of this operation was finished in less than five minutes, and nothing seemed to be amiss in the constitution of the patient, the event nevertheless proved fatal. After being put to bed, he had an anodyne, but slept not a moment all that night. Next day at twelve o'clock his pulse beat fifty-six in a minute, and, as he had no complaint, nothing was ordered. Exactly thirty-six hours from the operation, he was attacked with laborious breathing, accompanied with great anxiety, as he said, about his heart, his pulse up to 120, and very feeble. No reason could be assigned for this extraordinary change; but, on making inquiry at the nurse, I found that he had slept none for six days and nights past, owing merely to the terror he was in for the operation, by
which

which he expected nothing less than to be dissected alive. This had been put in his head by some foolish people in the Highlands, from whence he came; I then recollected some expressions made use of by him after the operation was over, which confirmed the accounts of the nurse; that on finding he had got so easily over it, he had appeared quite transported with joy. From the time that I saw him, the anxiety constantly increased; in two hours his pulse, which at first was 120, became so quick, that it seemed to be one continued undulation; and in two hours more he expired. The death of this patient was so unexpected, that I can scarce account for it, otherwise than by the sudden transition from fear to excessive joy, which he was unable to bear.

In November 1783, I was called to Mr J. G. aged sixty, whom I found labouring under a swelling of the right side of the scrotum, so large that not a vestige of the penis was to be seen. The cord was found in its natural state; and he informed me that the swelling began at the bottom of the scrotum, gradually ascending, and increasing both in size and weight till the present time. He being unwilling at that time to undergo the operation for a radical cure, I contented myself with making a puncture in the most depending part of the tumor,

II.

mor, by which six pounds of fluid were evacuated; the orifice being covered with a little cadice, and a pledget of simple cerate, the scrotum being supported by a proper suspensory bag. In two days the orifice was well, and the scrotum contracted to near its natural size; but the water soon began to collect again, and in about nine months I was sent for, and found the tumor nearly half the size of the former, but with this difference, that the swelling was pushed up towards the ring, and gave him much pain as it increased, particularly when he attempted to bend forward in the least. He now consented to submit to an operation. As he was of a robust constitution, and the complaint had been brought on by a bruise on the testicle upon mounting his horse, I determined to purge him freely. I therefore ordered him an electuary of crystals of Tartar for two days successively, and on the third performed the operation, by laying the patient across the bed, with his breach exactly to the edge of it, so that his feet rested on the floor. His thighs being thus distended, and held fast by an assistant on each side, I laid hold of the back part of the scrotum with my left-hand, grasping it so tight as just to make the skin tense on the opposite side; after which I made an incision, from the upper part of the swelling to the very bottom of the scrotum, with a round-edged scalpel, through
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the skin. Near the ring, and for two inches lower down, I found the vaginal coat covered only by the skin and the cellular membrane in the usual way; but, below this, to the very bottom of the scrotum, nearly four inches more in length, I found the latter thickened to no less than half an inch before the vaginal coat could be discovered, at the same time that the consistence of it was more solid than even muscular flesh; so that, in this under part, repeated strokes of the scalpel were required to cut through it. An abscess lancet was then introduced into the upper and most prominent part of the swelling, so as to admit the complete introduction of the finger of my left hand. Upon it I next introduced the probe-pointed knife, laying open the vaginal coat upwards to nearly its extremity, and turning it downwards, did the same thing. Here, however, as in the scrotum, I also found the under part of the vaginal coat remarkably thickened; and, as the edges of it stuck out considerably after the retraction of the skin, I dissected away nearly three quarters of an inch in breadth of each side of the thickened part. The testicle being perfectly found, I laid one fold of caddice, dipt in oil, within the vaginal coat on the side opposite to the testicle, from nearly the upper end to the lowermost part of it, leaving a part of the caddice here, as well as in every other part to which it reached, sticking out of the wound.

The

The sides of the wound were then brought together, and dressed with pledgets of simple cerate; the whole of the wound being afterwards covered with caddice, over which was put a small bonnet of tow, with a comprefs of linen above it, and the whole secured by a T bandage.

The patient was now put to bed, and had an anodyne draught, with thirty drops of laudanum. In five days the dressings were removed; but the caddice introduced into the bottom of the sac still remained firm, the scrotum being much swelled and uneasy. A large emollient poultice was applied, and changed twice every twenty-four hours. He was now almost free from every complaint, except what arose from the uneasiness of the wound; and in ten days the scrotum began to suppurate freely, the pain, swelling, and tension daily diminishing, but the caddice still remaining firm towards the bottom. He was now allowed his usual diet, and the poultice was removed, the usual dressings of the wound being continued. The caddice was entirely thrown out in eighteen days from the performance of the operation, the scrotum much reduced in size, and the wound discharging freely. The usual dressings were continued; and, in seven weeks from the operation, the cure was completed, the wound being entirely healed, and the scrotum reduced almost to its natural size; and at this

moment is in good health, never having had the smallest return.

In the month of October, the same year, I
was called to A. B. a man of thirty-six years III.
of age, who complained of a large swelling on
the right side of his scrotum, of an oval shape,
very tense; and, upon pressing suddenly on the
top, and alternating the pressure on the bottom
of the tumor, the fluctuation of a fluid was evi-
dently perceptible. From other symptoms, his dis-
temper appeared evidently to be a hydrocele of
the tunica vaginalis; so that, as he was quite
healthy, and the cord in a sound state, the oper-
ation was immediately determined upon, with-
out prescribing any thing else than a gentle dose
of physic. The operation was performed by
making an incision through the skin and cellular
substance as above directed, and opening the va-
ginal coat, near the middle, with a lancet, so
that the fore-finger of the left-hand could be in-
troduced, and thus the vaginal coat laid open,
both above and below, to both its extremities, as
mentioned in the preceding cases. Caddice dip-
ped in oil was then introduced, as already men-
tioned, and the lips of the wound brought to-
gether with part of the caddice sticking out.
The wounds were dressed with straps spread
thick with Turner's cerate, and the dressing fini-
shed and kept on as in the former cases; the
whole

whole being finished in the space of five minutes.

The patient being now put to bed, had a draught with thirty drops of laudanum. Two days after the operation, he complained of considerable pain in his scrotum, rising upwards to the belly, and spreading to the small of his back. His pulse full and strong, beating 100 in a minute, the skin rather hot, belly costive, with a slight headach, and thirst. Having lost very little or no blood during the operation, ten ounces were now taken from his arm, a gentle laxative injection given at bed-time, and a large poultice of bread and milk applied to the scrotum, after removing as many of the dressings as would easily come away. Next day, (Oct. 17th), the pain shooting to his back, was much relieved since the bleeding and injection, the latter having operated well. The poultice was again applied; and, as he had slept but little last night, an anodyne with thirty drops of laudanum was given at bed time.

18th, On removing the poultice, all the dressings came away at once, but no purulent discharge followed, though the wound looked tolerably. The pains shooting to the back were considerably relieved, but the scrotum continued much swelled, and very painful. Ten ounces of the infusion of tamarinds, with a double quantity

tity of fenna, were ordered to be taken at twice in the morning, an hour between each dose; the poultice continued.

19th, Physic had operated well, with great relief every way; the wound beginning to discharge pretty copiously; poultice continued.

24th, The dressings within the vaginal coat came away this day, along with a pretty copious discharge of thin matter; the sides of the scrotum were pressed close together, and the edges of the wound drawn towards each other by straps spread with gently adhesive plaster, to within an inch and an half of the under extremity of the opening; the whole being then covered with caddice, and the dressings kept on by a T bandage as directed. He was now allowed animal food every day at dinner, with a bottle of London porter, two glasses of wine, or a little spirits and water, with his usual food for breakfast and dinner. The wound was dressed regularly every day for five weeks; at the end of which time it was completely skinned over, though the scrotum continued more full on that than the other side. This fulness continued for several weeks, but entirely subsided, and since that time he has never had a complaint.

M. G. had been affected with an hydrocele of the tunica vaginalis, for which he

IV.

had

had been punctured in the summer of 1783, and nearly six pounds of water drawn off from the right side. In three months after the operation, the water began again to collect; and, in March 1784, he came to Edinburgh with a design to undergo the operation for a radical cure. It was accordingly performed in the usual manner; but on laying open the vaginal coat, as in the preceding cases, all the sides of it were found full of water in cells resembling small hydatids, every one of which I was obliged to lay open by repeated strokes of the scalpel. The testicle was completely found; but, as the vaginal coat had not only been long exposed to the air, but likewise to the pressure of a warm sponge, the sides of it were brought immediately into contact with each other, as well as the testicle. The edges of the wound being brought immediately into contact, the parts were retained in this position by adhesive plasters, which in a great measure were made to surround, and gently to press the whole of the diseased side of the scrotum together.

The wound being dressed, and the usual means for keeping on the dressings applied, the patient was put to bed, and an anodyne given at night. He slept tolerably well, and next morning was quite free from pain, the pulse natural, appetite good; but was confined to a low diet for a day
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or two. In three days from the operation he began to complain of a slight pain, attended with a considerable degree of heat in the affected side. His belly being costive, he was ordered an injection of a pound of warm water; the dressings, which would easily come away, were removed, and a large poultice of the crumb of bread, and a solution of sugar of lead, (made with three drams of the sugar, two ounces of vinegar, and thirty of water), applied all over the parts, and ordered to be renewed thrice a day.

Fourth day from the operation, pains greatly relieved; the injection had operated well; poultice to be continued; and, in the morning, to have four ounces of the infusion of tamarinds with fenna every hour till it operated.

5th, Has had three copious stools. On removing the poultice, the straps came away along with it; the pain of the scrotum gone, though a considerable tension and swelling of the parts still continue; the sides of the wound seem in many places to have coalesced. The straps were applied again, and the poultice over them. Having now no complaint, and his appetite being good, he was allowed to dine upon any kind of solid food he chose, only cautioned against eating much at once; and, having been accustomed to take a glass of wine rather freely after dinner,

dinner, he was now indulged with four glasses daily at that time.

8th, Swelling and tension of the scrotum greatly diminished, without any pain, excepting when roughly handled. Sides of the wound seem to adhere completely, except for about an inch near the bottom of the scrotum; the parts were still supported by the application of the straps; but as the poultice was now become troublesome, it was taken away, and the nurse taught to apply a piece of flannel moistened in the above mentioned solution, for an hour, three times a day, covering up the parts during the intervals with caddice, in a proper suspensory.

14th, The wound seemed completely healed; and though there was a considerable thickness over the whole surface of the testicle, not the least softness or tendency to fluctuation could be perceived in it. In two weeks more the patient seemed completely cured, and went to the country. It is now nine years since, and he has never had the smallest return.

P. R. aged forty, had for two years
been afflicted with a swelling of the left V.
side of the scrotum, which had gradually increased, until at last it came to be of a great size, but without occasioning any other uneasiness than what arose from the weight. The tumor
was

was quite opaque, but by other signs evidently showed itself to be an hydrocele vaginalis. He readily consented to undergo the operation; and, as the spermatic cord was found, and the patient otherwise healthful, it was immediately performed by laying open the vaginal coat in the manner already directed. About two pounds of a coffee-coloured liquor were drawn off, the testicle appearing flaccid, and of a size smaller than natural. A piece of caddice moistened in oil was then introduced as directed, the lips of the wound brought together, and the edges of it dressed with simple cerate.

In five days after the operation, the whole of the external dressings were removed. Scrotum much swelled; lips of the wound thick and flabby; dressings inserted within still firm; pulse about 100; belly costive. Had an injection of twelve ounces of warm water, and two ounces of oil. Had also a large emollient poultice applied to the scrotum for two days longer, night and morning, when the whole of the external dressing came away easily. The size of the scrotum from the free discharge of matter that had taken place was much diminished; and the pulse now beat only eighty-six strokes in the minute. Was ordered eight ounces of the simple infusion of tamarinds and fenna to be taken on the eighth morning after the operation, and the wound

wound to be dressed superficially, bringing it together by adhesive straps. On the twelfth day from the operation, wound looking remarkably well; swelling much diminished, as well as the discharge; was dressed as before. But the edges of the wound were now completely brought into contact, from the uppermost part of the incision to the bottom; and the patient was now ordered animal food for dinner, and a glass or two of port wine regularly after it. Having now almost no complaint but weakness, no medicine was further necessary. He was dressed regularly every day as above mentioned. In twenty-six days from the operation's being performed, the edges of the wound adhered accurately; and except a very small degree of fulness, without the least fluctuation, nothing else remained. The parts were ordered to be constantly suspended in a suspensory bag, till the whole of the fulness should be removed. And although near five years since the operation was performed, he has not at this moment the smallest degree of swelling or uneasiness in the part.

In February 1785, I was called to A. M. twenty-eight years of age, who complained VI. of a large tense and oval swelling on each side of the scrotum, but larger by one third on the right than on the left-side. They had begun a-

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bout two years before, after considerable fatigue and exposure to cold. Both felt remarkably tense, and gave an evident sensation of fluctuation to the finger when properly applied. As the patient was healthy, I proposed to operate upon both sides at the same time, which was accordingly done on the tenth of this month, by making an incision through the skin and cellular substance the whole length of the tumor on the right-side, and laying open the vaginal coat, as directed, from one end to the other. I then cautiously scratched a hole in the septum scroti, upon which the water flowed out from the left vaginal coat; and I next introduced my finger through the opening, and dilated it to the very bottom; after which a small piece of caddice, about four inches in length, and one in breadth, dipped in oil, was thrust into the left vaginal coat, the inferior end of it being left about half an inch without the lips of the wound at the bottom. The right side was dressed from the bottom with a piece of caddice dipped in oil as directed, and the wound dressed in the usual manner. After the patient was put to bed, he had an anodyne draught, with thirty drops of laudanum, to be repeated at bed-time, if there should be occasion.

11th, Has had a good night, with no great pain, but complained of an uncommon heat, with slight
tension

tension in the wounded parts. Pulse ninety-six and sharp; skin hot; was blooded to ten ounces; had a large watery glyster in the afternoon, and a draught was ordered at night.

12th, The injection had operated freely; the blood taken away was covered with a buff-coloured coat; pulse eighty-four, and much softer; heat and tension of the scrotum abated; has had a tolerable night. Injection and draught to be repeated.

13th, Slept well, and is now much easier in every respect. As many of the dressings to be removed as will easily come away; and a large emollient poultice to be applied all over the scrotum at bed-time, and renewed in the morning.

14th, Dressings came away on removing the poultice; the lips of the wound thick and flabby, without any purulent discharge. Considerable pain and tumor in the scrotum from being much handled. A piece of dry caddice was now put over the wound, and the whole covered with an emollient poultice, to be renewed thrice a day; a watery glyster had been given every second night since the operation, with an electuary of an ounce and a half of chrystals of tartar mixed up with syrup, of which he was to take a tea-spoonful every morning until it operated.

18th, Wound

18th, Wound discharged freely; swelling and pain considerably abated; the dressings within the scrotum still continuing firm; the poultice was continued; but, as the patient was perfectly free from fever, he was now allowed a little animal food for dinner, with half a bottle of porter daily.

22d, Pain and inflammation much lessened; the dressings of the right-side came away this day with great ease, but those of the left still remained firm. Poultice now to be removed; sides of the wound kept close together, and its edges dressed with straps spread with simple cerate and caddice as directed, and kept on in the usual manner.

26th, A copious discharge of excellent pus; the internal dressing of the left vaginal coat removed to day with some little difficulty, having contracted an adhesion at the upper end. Its removal was followed by the discharge of about two ounces of thin watery stuff, mixed with a little blood and purulent matter; wound beginning to heal from the upper part as well as from the bottom. Dressed as usual.

March 4th, Swelling and tension still diminishing; wound discharging freely; about half of the surface of the right testicle exposed to view by reason of the retraction of the lips of the wound.

Attempted

Attempted to bring together the gaping lips by adhesive straps. Dressed as usual.

10th, Swelling and tension of the scrotum almost completely gone; wound healed, except at the part where a little portion of the testicle is still bare. Dressed with simple cerate and a little caddice as usual.

April 1st, Wound nearly cicatrized; pain and swelling entirely gone; the patient has been going about for the two last weeks without the least inconvenience.

In September 1785, I was called to
W. R. aged sixty, afflicted with a swelling of the left-side of the scrotum ten inches long, and nearly eight in circumference, which had begun some years before after a fever, and had ascended gradually from the bottom of the scrotum. The tumor was opaque, but by its fluctuation and other signs, evidently showed itself to be a dropsey of the tunica vaginalis. The size of the tumor, as well as the delicacy of the patient's constitution, in this case, induced me to propose to let off the water by puncture, rather than to perform the operation for a radical cure. This was immediately done by means of a trocar, and about a pound and an half of a greenish fluid drawn off, when the discharge was interrupted, and could not be renewed by the introduction
of

VII.

of a probe. The trocar was therefore removed, and a grooved directory introduced through the opening, which was now dilated to the length of an inch and a-half, through which a great quantity of hydatids, some of them of a large size, filled with a liquid of the same kind with that which had been evacuated, came out to the amount of about six pounds weight in all. The whole of these, as well as the water, being evacuated, I introduced a piece of caddice within the opening for about two inches and an half in length, leaving nearly about the same length hanging out of the wound. As the puncture had been originally made in the most depending part of the tumor, no water could be retained in the inside of the vaginal coat. The wound was now dressed in the usual manner, the scrotum supported by a T bandage, and the patient put to bed. He had become faintish from the quantity of water discharged, but recovered on being put to bed, and taking a little spirits and water. At night he had an anodyne draught, and rested well. Next morning he had no complaint; but in four days after began to complain of pain and uneasiness, with a degree of heat in the scrotum. On removing the dressings, the vaginal coat was found considerably indurated throughout its whole length, and painful to the touch, being also much swelled

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towards the lower part, the integuments moreover being much inflamed, and the internal dressings remaining firm. An emollient poultice was ordered to the scrotum, to be renewed thrice a-day. He was likewise ordered twelve ounces of the infusion of tamarinds and fenna, of which he was to take a wine-glassful every hour in the morning until it operated. By this he had two copious stools, which afforded great relief; the internal dressings were removed, and nearly four ounces of a very high-coloured fluid discharged. A piece of caddice was now again introduced into the vaginal coat through the lips of the wound, and dressed as formerly, with a poultice over it. The discharge of high-coloured fluid mixed with a little matter from the wound, continued to be considerable for ten days; but, during this time, the pain and swelling greatly diminished. The opening, however, was still kept slightly filled with caddice as before, and I determined to keep the wound open as long as any thing was discharged. In eight weeks from the operation, the wound was completely healed up, and the whole of the vaginal coat and scrotum contracted nearly to their natural size and feeling. Throughout this cure it was observable that the vaginal coat contracted from above downwards, being at first very hard and painful upon pressure; but,

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by degrees, the hardness went off, and it returned gradually to its natural size and softness, going on, in this way, throughout its whole length, till the cure was completed. This patient has continued ever since free from the disease, and is at present in perfect health.

In March 1786, I was called to A. M. VIII.
thirty-eight years of age, who, for a twelvemonth before, had laboured under an hydrocele of the right testicle, succeeding a virulent gonorrhœa. The operation was performed in the usual manner, by completely laying open the vaginal coat. About twelve ounces of fluid were evacuated, and the testicle appeared quite sound. After being exposed to the air for a few minutes, the sides of the vaginal coat were brought together round the testicle, and the edges of the wound made to touch by means of straps of adhesive plaster surrounding the whole scrotum. A large pledget of simple cerate was then laid on, extending from one end of the wound to the other in length, and about three inches in breadth, several folds of linen being put over the whole, and the usual dressings applied. Having had little pain or fatigue from the operation, he was put to bed without any medicine; and, during the whole of the cure, which was completed in eighteen days, he had
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not the smallest complaint, except on the third and fourth days from the operation, when he complained of a slight pain striking up to his groin, with an uncommon sensation of heat in the wound; but all these were relieved in two days by a drachm of the compound powder of jalap, which operated freely, and keeping the parts moist with the common solution of sugar of lead. The hardness and pain having gradually decreased, the lips of the wound adhered by the first intention.

In January 1787, I was called to W. IX.
L—n, aged forty-eight, afflicted with an uncommon swelling on the left side of the scrotum, eight inches in length from the one extremity to the other, and about three inches round near the middle, having some resemblance at each end to a cylindric oval. In other respects he was healthy, and said that the complaint came on without any perceptible cause. It was of four years standing, and the swelling had increased very gradually from below upwards. The operation was performed in the usual way, but no more than five inches of the scrotum and vaginal coat were laid open. The wound was dressed as usual with caddice, and a T bandage. As he complained of much pain from the operation, a draught, with thirty drops

of laudanum was given him; notwithstanding which, he had a very restless night, the pain having continued very severe, and increased towards morning. His pulse being at ninety-six and full, I took away ten ounces of blood, and gave him a large watery injection in the afternoon, repeating the draught with ten drops more of laudanum at night.

January 12th, Pulse quick but soft; pain and tension continue. Applied a large emollient poultice over the whole scrotum, after having removed as many of the dressings as could be easily taken away. Twenty grains of the compound powder of jalap were then given every hour in a glass of barley-water till it operated.

13th, Pain and fulness somewhat relieved. Took three doses of the powder, which operated fully. Poultice to be continued, and changed three times a-day.

15th, Dressings totally removed from the surface of the wound; the edges red, and flabby, and swelled, with little or no discharge. The wound was very slightly dressed with charpee, and the poultice ordered to be kept constantly applied. Pulse eighty. He was allowed chicken-broth, with a small part of the chicken for dinner.

18th, A kindly suppuration began to come on, and a separation to take place of the dressings.

sings in the inside of the vaginal coat; the edges of the wound also much less swelled, and looked better. They were dressed with straps spread with simple cerate, and the centre being filled with caddice, and dressed in the usual manner.

24th, The whole of the dressings within the vaginal coat were this day removed; and the patient being entirely free from pain and uneasiness, was allowed to return to his usual diet. The wound was dressed regularly every day, and the sides of it kept together by adhesive straps; but, as near an inch of the testicle was exposed to the air, by reason of the uncommon retraction of the skin, which I was not able to prevent, it was ten weeks before it was wholly cicatrized. While the edges of the scrotum healed in this manner, granulations shot up from the body of the testicle itself; and these, even after the skin had covered them, continued to be very tender, and still remain so, though he has never had the smallest return of the disease.

W. B. aged fifty-two, was visited in April 1788. I found him labouring under a large hydrocele of the right vaginal coat, of a pyramidal shape, and extending nine inches downwards, with the small end uppermost. The swelling was so great that the penis had totally disappeared; and it was easy to perceive a fluctuation

X.

tuation by alternating the pressure with the hands at a considerable distance from one another, though the rays of light did not pass through it. The complaint was of no less than four years standing, and had originated from an accidental bruise on the right testicle. Little or no swelling was perceived for the first year, except at the under point, but after this it gradually increased, and before the last twelve-month acquired about half the size it had when I saw him. In all other respects he was healthy, except that at times he had a pain in the small of his back, which, he thought, was occasioned by the excessive weight of the scrotum. The size of the tumor was so great, that I proposed at first only to draw off the water by means of the trocar; I accordingly made an opening in the skin of about half an inch long with a lancet, introducing afterwards the flat trocar through this opening a little below the skin, turning its point, and pushing it cautiously upwards and backwards through the vaginal coat. This was followed by the discharge of a dark-coloured fluid; but, when about one half seemed to be drawn off, it stopped at times almost entirely, though a pretty large probe was frequently introduced. I now suspected, as in a case already mentioned, that the water was contained in hydatides; for which reason the
canula

canula was removed along the probe, leaving the end of it within the vaginal coat, to serve as a conductor for a grooved directory, which was introduced, and the opening enlarged by the straight probe-pointed knife to about two inches, through which the whole contents of the sac were immediately discharged, and a considerable number of hydatides of various sizes came away. On examining the testicle with my finger it appeared sound, but felt rather soft and flabby. I introduced a piece of double caddice exactly broad enough to fill the wound, and dipped in oil. This was put about two inches within the vaginal coat, the other end being left freely hanging out; several folds of caddice being laid over all, and the dressings retained in the usual manner with a bandage. The quantity of water drawn off by this operation was five pounds and an half; and, as the patient had sat in a chair during the whole time, he was now become a little faintish; but being put to bed, and having a glass of wine given him in an horizontal posture, he soon recovered. He had no complaint, excepting that, on the third day after the operation, he had a little degree of pain, heat, and tension, with some fulness and hardness near the ring. For this he had seven drachms of Rochelle salt, dissolved in some weak tea, which operated fully

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two or three times. The dressings were removed on the fifth day after the operation, a poultice having been previously applied for 24 hours. In this case the caddice introduced within the vaginal coat came also away at this time; and, along with this, nearly four ounces of an high-coloured fluid. The lips of the wound, as well as almost the whole under half of the scrotum, continued swelled and inflamed; and the upper part of the vaginal coat, from the the ring downward, felt hard, contracted, and painful, especially when pressed, but not otherwise. A piece of caddice, dipped in oil, was again introduced as formerly; and the wound dressed as before. The dressings were removed in three days, by which time the edges of the wound had begun to suppurate and discharge freely. The same mode of dressing was continued; and, by introducing caddice in this way every second day, the patient was able, in three weeks from the operation, to walk about easily, though the wound was not quite healed up, only much contracted, as well as the whole of the scrotum, a little fulness being all that remained at the under end of the testicle, and downward to the opening. The fore was completely healed in four weeks from the operation, and the patient restored to his full health and spirits, and the size of the scrotum nearly natural.

I operated in the same manner, in September that year, on a patient aged sixty, from whom I took six pounds of water, and in twenty-four days the patient was completely cured, without taking a single medicine of any kind; only, as the discharge was very considerable, the matter being high-coloured and fætid, throughout the whole of the cure, it was necessary to throw up a weak solution of lead into the wound, of no more than three grains of the salt to an ounce of water.

In March 1792, I acted as assistant to a gentleman in the country, who had under his care a patient sixty-four years of age, afflicted with an hydrocele still larger than any of those I have yet mentioned; and, on my proposal, he immediately agreed to proceed as in the last two cases. Seven pounds of water were evacuated on making an opening about two inches long in the skin of the scrotum, and then piercing the vaginal coat with a lancet, made the opening here of the same extent. The cure went on without the least difficulty, and was completed in four weeks. The patient got no medicine throughout the whole course of the cure, excepting once or twice a gentle laxative.

J. A——n, forty-three years of age, slightly bruised his right testicle in mounting his horse; six weeks after which he felt a weight in
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it, with a slight fulness in the lower part, which, however, felt soft, without any pain when touched. From that time the swelling continued to increase by slow degrees, for two years. I saw him in April 1788, and as he wished for a radical cure, and the tumor was of the most common shape and size, I attempted it by making an incision from one end of the swelling to the other. Having thus completely discharged the water, I examined the testicle, which appeared quite sound. It was exposed to the air, for the space of about a minute and an half, and the whole inner surface gently dried with a warm and soft sponge. The lips of the wound were then brought close together, and secured in that situation by adhesive straps surrounding the whole of the scrotum, in such a manner as to keep every part of the sides of the vaginal coat in close contact with the body of the testicle, as well as with one another. Over these adhesive plaisters was put a pledget of cerate; the wound being otherwise dressed as directed; the patient felt no uneasiness from the operation, and therefore no draught was given him after being put to bed; but, on the second day, he began to complain of pain and tension in the wounded part, on which the dressings were removed, and the parts kept constantly moist with two folds of flannel dipped in a solution of sugar of lead, made as already directed; four ounces of infusion of

tamarinds, with a double quantity of fenna, being given every two hours until it should purge him. He had panado for breakfast and supper, and chicken broth and bread for dinner; barley water, or lemonade being allowed for drink.

April 11th, Physic has operated freely and copiously, the pain and tension greatly relieved, though he was obliged to rise every time to go to stool. Pulse quiet, without heat or thirst. Drink and diet continued as before.

13th, A considerable fulness and hardness still remaining; the tumor painful if but slightly pressed. Saturnine applications continued, without any alteration in diet. Ordered four ounces of infusion of tamarinds and fenna to be given in the morning, every hour and an half, until it operated.

15th, Physic operated well; hardness and fulness greatly diminished. The adhesive straps were now removed on account of the moisture. The sides of the wound healed up, except about an inch and half in the middle, where the straps seemed to have lost their adhesive property. Having wiped the scrotum quite dry, they were again applied; and, two hours after, the saturnine application was ordered to be repeated, and regularly continued. He was now allowed tea and dry toast for breakfast, with a chicken, mut-

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ton-chop,

ton-chop, or beef-stake, done upon the gridiron, for dinner, with a draught of porter after it.

20th, Wound quite healed ; swelling almost entirely gone, with very little uneasiness on handling it, and not the least perceptible fluctuation.

30th, Health entirely recovered, so that he can walk without the least inconvenience ; swelling and hardness still diminishing. Ordered the part to be kept suspended, until every symptom of hardness and swelling was gone, which happened in the month of July after, scarcely even the rising of the cicatrix being perceptible.

W. B——n, aged twenty-six, was seized with a swelling in the left-side of the scro- XII.
tum, without any apparent cause, which, for eighteen months, gradually increased. The tumor was transparent ; and as the spermatic cord was entirely free from disease, I operated upon him in the usual manner, but dressed the wound without introducing any thing into the cavity of the sac. The patient was treated exactly as in the former cases, keeping the belly open by gentle laxatives ; and in eighteen days the cure was completed ; the testicle and scrotum on that side, in two weeks more, being scarce to be distinguished from the other.

July

July 31st 1792, W. M——d, sixty-
six years of age, put himself under my
care. About a twelvemonth before he had a
fall from an horse, by which he was considerably
bruised; soon after which a swelling took place
in the left-side of the scrotum, which gradually
increased from that time till it arrived at a con-
siderable size. When I first saw him, it was e-
qual, elastic, and colourless, extending to the
ring, small at the under point, but considerably
increased in diameter at the upper part. In o-
ther respects he was in perfect health.

XIII.

Aug. 4th, The operation for hydrocele was
performed, and two pounds of water evacuated.
As the testicle appeared sound, the edges of the
wound, and sides of the vaginal coat, were
brought close together as in the above, after
having been exposed for some little time to the
air; being afterwards slightly dressed.

5th, Had a good night, with little pain in the
scrotum, but complains of a slight pain in the
small of his back. Pulse eighty-four; tongue
dry. Four ounces of saline julap ordered every
two hours.

7th, Pain of his back greatly relieved; but
as the belly was costive, and the swelling and
tension of the scrotum considerable, a poultice
of the crumb of bread, with sugar of lead, was
applied to it; half an ounce of lenitive electuary,
with

with a drachm of crystals of tartar, and as much syrup as would make it into an electuary, was ordered; a tea-spoonful of which he was directed to take every hour and an half until it operated.

9th, Physic operated freely; the wound looks well, and the edges perfectly in contact; but still a considerable degree of tension on the scrotum. Ordered the saturnine application to be continued, and the physic to be repeated in the morning.

10th, Swelling and inflammation much abated; saturnine application and adhesive straps to be continued.

14th, Wound nearly healed, and swelling almost gone.

20th, Wound quite heal. Scrotum to be kept properly suspended and warm till the fullness be completely gone. At the time of writing this, eight months have elapsed since the cure was completed; and, during all this space, there has never been the smallest return of the swelling or hardness; so that the one side of the scrotum cannot be distinguished from the other, except by a small cicatrix, scarce visible, though it may be felt.

Sept. 12th 1792, I visited A. F——y, XIV.
aged fifty, who complained of a large,
tense,

tense, elastic, and colourless swelling on the right-side of the scrotum, but painful only when pressed pretty hard. No cause of the complaint was known, unless that he had strained himself; the swelling was transparent, and excepting it he had no complaint. The operation was performed in the usual manner; the vaginal coat was not stuffed with any kind of dressing; only all parts of it were brought into contact with the testicle, the sides of the wound to each other, and kept so by adhesive straps. During the whole course of the cure, it was only found necessary to exhibit gentle laxatives, and to prevent or allay any high degree of inflammation by saturnine applications. In eighteen days the cure was complete.

From a consideration of the cases above related, it is evident, that, as I have already observed, a radical cure can only be expected by producing such a slight degree of inflammation in the internal part of the vaginal sac, and surface of the testicle, as will make them adhere to each other. And as various methods of doing this have been attempted, but most of them too rough to be practised with safety. Even that most gentle one of interposing between the vaginal coat and testicle a single ply of caddice is often attended with the disagreeable circumstance of its adhering to the testicle, so that it cannot be removed

ed without giving the patient a considerable degree of pain, of which some instances are above related, as well as a very high degree of inflammatory fever sometimes ending in gangrene, with all its fatal consequences. An easier method is therefore still desirable; and indeed this seems obtainable by merely exposing the parts for a very short space to the air, and then wiping them dry, and keeping them in close contact with each other. In six instances this has succeeded with me; and it would certainly be worth the attention of every practitioner to try to the utmost any method by which so much service could be done to society, and a number of people saved, not only from extreme pain, but even from danger of their lives, by reason of the high degree of inflammation and its consequences which are frequently produced by the other methods. From what happens in other parts of the body, indeed, it is very natural to suppose that the method just now mentioned must always prove successful. If two fingers, for instance, have the scarf-skin rubbed off them, and are in that state kept for some time in contact, they will adhere together, without the interposition of any substance, merely for the purpose of irritating or inflaming them. Were they sprinkled with any kind of caustic powder, no doubt the same effect would be produced; but
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it is evident that in this case, supposing such an adhesion wanted, the caustic could answer no other purpose than to give the patient pain, and prevent them from adhering for a considerable time longer than would otherwise be necessary. Now, precisely the same is the case with the tunica vaginalis and testicle. These parts are so exceedingly soft and tender, that the wiping them in the most gentle manner is equivalent to the abrading of the skin in other parts, and most probably would always produce the same disposition to adhesion. In the six cases above-mentioned, we see that it actually was so; and there is no reason to doubt of its being the same in every other instance. Indeed, when we seriously consider the matter, it is impossible to see how the adhesion of any two parts can be promoted by keeping them for some time *at a distance* from each other, as is done by the interposition of the caddice between the testicle and vaginal coat in the usual mode of curing the hydrocele. If a slight inflammation is desired, that may be obtained at once by a slight injury done to the parts, and we have seen that the wiping them slightly with a soft warm sponge, or perhaps mere exposure to the air, is sufficient for that purpose; indeed, so great is the tendency of them at any rate to inflame when exposed to the air, that it is evident

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we have occasion rather to prevent and moderate it than use any rough method to that purpose for the accomplishment of a radical cure. Little more is necessary than to make a depending orifice of such a size as will allow the water to be freely discharged along with any other collections that may have been formed; keeping this orifice quite open and free throughout the whole course of the cure, during which time the scrotum gradually returns to its natural shape and size, the vaginal coat gradually contracting from above downwards. While a free discharge is thus given to the matter, the external air is likewise admitted; and thus, perhaps, all good the effect produced by wiping the internal surface of the vaginal coat and testicle, every degree of inflammation necessary to produce the wished for adhesion may be obtained. In this way I have no reason to doubt that a radical cure might be effected, with almost as little pain as is given to the patient by the palliative one, when the water is let out by a simple puncture; only remembering that when a radical cure is to be effected in this way, the opening must be at least an inch and an half in length, and that at the most dependent part of the scrotum; and particular care must be taken to dress the wound properly by introducing the dressing at least an inch and half within the vaginal coat; for here,

as well as in the ordinary way, a fault in the dressing might prevent the free discharge of the water, by allowing the wound to heal too soon, and thus obstruct the cure of the disease, which, I am sorry to say, I have frequently observed, from want of proper attention to this circumstance, even as the operation is now performed.

On the whole, it appears, from the cases above related, that there are two ways in which the radical cure of an hydrocele may be performed, and that in half the time usually taken by the method of incision, without any high degree of inflammation taking place. One is, by allowing a free discharge to the water through an orifice of about an inch and an half in length. This is to be made in the most depending part of the scrotum, and, by its size, allowing the testicle to be examined by the finger, at the same time that the air is freely admitted into the cavity. Keeping the wound open also by the introduction of a piece of lint, the cure will be performed both quickly and perfectly. Might not then every case of hydrocele be cured in the same way, with as much ease and certainty as those above related? In all of them the collections of water were nearly three times greater than those ordinarily met with. It will be obvious, at the same time, that if by injecting any kind of fluid into the sac a cure is performed,

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the more simple that fluid is, the less danger there will be of a very high degree of inflammation, with the mischievous consequences to be expected from it. The other method is by simply laying open the sac throughout its whole length, and exposing it not only to the air, but gently wiping it with a warm and soft sponge, to clean, as it were, the whole inside from the former contents. You must then be careful to bring every part of one side of the wound of the sac into contact with the other, as well as the whole in contact with the surface of the testicle, securing them in this way by adhesive straps, which will not only keep the edges of the wound in contact, but the rest of the parts also, which will, of course, coalesce; and the good effects of this are evident in six of the cases above related.

I shall only farther observe, that it is always of the utmost importance to prevent an inflammation from running high, let it be in any part of the body you will, but much more so in these parts, where even a suppuration might be attended with dangerous consequences, and where a gangrene very easily comes on. In all the cases above related, the inflammation was kept down by remedies both internal and external; and I look upon it to be the duty of every surgeon to be particularly careful in this respect.

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Should the practitioner be ever at a loss to distinguish a disease of the testicle when conjoined with an hydrocele, he may easily satisfy himself, by laying open the tumor cautiously, either at the most depending part as directed, or in the ordinary way, by incision. To extirpate a testicle when the patient only labours under an hydrocele, is a mistake, which cannot fail justly to involve the operator in censure, and brand him with the imputation of stupidity or rashness, let his rank in the profession, or former character be what they will, because he had it in his power so easily to satisfy himself whether the case was so or not.

HYDROCELE OF AN HERNIARY SAC.

THOUGH in all the cases where I had an opportunity of dissecting those who died of herniæ, I could not find the smallest appearance of water, yet it is a commonly received opinion, that, especially where the herniæ have been of long standing, there is a small collection of this kind; and if the absorption of it be prevented, an hydrocele

drocele may take place from this cause. But whatever may be in this, it is certain that the disease does sometimes take place; and various authors have given instances of it. Dr Monro particularly mentions a case where six pounds of water were collected in the sac of an hernia, and discharged by the puncture of a trocar. I myself have seen three instances of it; two of them were from hernia congenita; and both of the patients were pretty old men, having, along with this complaint, symptoms of water in the abdomen. They were both cured by making a puncture with the trocar to evacuate the water, and giving them afterwards as much of the crystals of tartar as they could bear to purge them every day. The other had been occasioned by wearing a truss with a strong spring. It was laid open, dressed with caddice to the bottom, and healed in the usual way. The proper distinguishing sign of this species of hydrocele is, that the water can be made to pass into the abdomen, and the tumor entirely to disappear; though even this is not absolutely certain, as Le Dran mentions a case where the mouth of the herniary sac was absolutely shut, so that the water could not be forced up from the scrotum. With regard to the cure, it seems only necessary to observe farther, that if the use of a seton be improper in any case of hydrocele, it is here particularly

ticularly dangerous, on account of the chance there is of wounding the intestine. Simple incision is therefore the only method that can be followed with propriety.

CHAP. IX.

OF THE HÆMATOCELE, VARIOCELE,
SARCOCELE, AND OTHER KINDS OF
FALSE HERNIÆ.

SECTION I

OF THE HÆMATOCELE.

A tumor of the scrotum, resembling the hydrocele, but filled with blood instead of water, is distinguished by the name of *Hæmatocele*. From the nature of its contents, we see evidently that it may be occasioned by any thing which ruptures the blood-vessels on the inside of the tunica vaginalis, or the surface of the testicle itself.

self. Like the hydrocele, however, it is not absolutely confined to the tunica vaginalis, but is met with in the spermatic process, and sometimes in the dartos. A violent blow upon the scrotum may produce an hæmatocele, not only in the cellular substance of that part, but in the vaginal coat of the testicle, or even the spermatic process and cord; and by reason of the great laxity of all these parts, the rupture of even an inconsiderable blood-vessel will be attended with a plentiful extravasation of its contents, and produce a large swelling. It may be produced by the puncture of a trocar, in letting off the water of an hydrocele of the tunica vaginalis; in which case we are commonly informed of the accident by the discharge of blood along with the water. Sometimes it may be occasioned by the sudden evacuation of water, when the relaxed state of the vessels renders them unable any longer to sustain the impetus of the circulating fluid. In all cases, however, this kind of tumor arrives at a considerable size in such a short time, that from this circumstance alone we may distinguish it from the true hydrocele. A collection of blood in the scrotum itself always gives the colour of a real echymosis; in the tunica vaginalis, or other parts, it feels heavier, by reason of the superior specific gravity of the blood; but, wherever it is situated, the treatment
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must always be the same with that of a real hydrocele ; only if, after the incision is made, we can distinguish a ruptured vessel of any consequence, we are by all means to secure it by a ligature. Sometimes indeed, though this cannot be distinguished, there is such an oozing of blood from the capillaries, that the flux cannot be restrained, even by the most powerful astringents ; and, in this case, there is no other remedy but the extirpation of the testicle.

SECTION II.

OF THE VARIOCELE, CIRSOCELE, &c.

WHEN the veins of the scrotum are distended with blood in such a manner as to produce a considerable swelling, the disease has the name of *Variocele* ; if this happens to the vessels of the spermatic cord, it is called *Cirsocele* ; if to those of the vas deferens or epididymis, it is called *Spermatocele* ; and lastly, when the scrotum is distended, or supposed to be so with wind, the tumor is named *Pneumatocele*.

A kind of tumor, occasioned by a collection of blood within the tunica albuginea of the testicle, is mentioned by Mr Pott as a species
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of hæmatocele, though, from the observations made upon it, it seems rather to belong to the variocele. Sometimes the collection is so considerable, that a fluctuation similar to that of an hydrocele of the tunica vaginalis is observable; but if, in this case, we attempt to draw off the fluid by means of a trocar, the evacuation is never proportioned to the size of the tumor, only a small quantity of dusky-coloured fluid, resembling thin chocolate, being obtained. Neither is the patient ever relieved, but, on the contrary, made much worse by it; so that the disease frequently proves fatal, or at best it becomes absolutely necessary to extirpate the testicle. As the disease, however, is always occasioned by too great a relaxation of the blood-vessels, it frequently happens that even this remedy proves ineffectual; for it is in these cases impossible to restrain the hæmorrhage effectually; and thus, after repeated hæmorrhages, the patient most frequently perishes miserably. In disorders of this kind, it seems much better for the surgeon to advise the patient to use no other remedy than a proper suspensory, rather than to attempt a radical cure; because it has been observed, that, when once formed, the tumors will thus remain stationary for many years, while they never fail to be greatly exasperated by any attempt to evacuate the fluid.

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What has been said of this disease, is equally applicable to the cirsocele or spermatocele; and with regard to the pneumatocele, it is by no means probable that it ever takes place, otherwise than as an emphysematous swelling, or diffusion of air through the cellular membrane of any other part of the body. This only can happen from wounds of the lungs, and is to be remedied by making a number of punctures through the skin, as in the case of anasarcaous swellings.

SECTION III.

OF THE SARCOCELE, OR SCHIRROUS TESTICLE.

THIS disorder occurs much more frequently than those treated of in the former section. It consists in an enlargement of the testicle, much more firm and hard to the feel than any swelling of the nature of *hernia humoralis*, or *inflamed testicle*. The first symptom is usually a small enlargement of the testicle, without much pain, or any discoloration of the part. The tumor becomes gradually larger, and the hardness increases, but for a considerable time the surface remains smooth; and, if the constitu-

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tion be otherwise found, the disease will sometimes remain stationary for a number of years together; nay, sometimes, though very rarely indeed, it disappears entirely, by using a proper suspensory, a moderate diet, keeping the belly open, and avoiding violent exercise, or any thing that may considerably augment the impetus of the blood. In less favourable cases, the patient is attacked with slight pains through the substance of the tumor, as well as some uneasiness in his back, when a proper suspensory has not been made use of; the size of the tumor is augmented, sometimes very rapidly; its surface becomes ragged and unequal, and severe shooting pains are frequently felt through its substance. Sometimes an extravasation of serum takes place in the tunica vaginalis, or matter is collected throughout different parts of the tumor; and the disease continually increasing, terminates at last in an ulcerated cancer of the worst kind; the scrotum bursting, and thin bloody matter being discharged from the opening. But, though this discharge is often very copious, the size of the tumor is not thus lessened, but, on the contrary, continually increases; the health and constitution of the patient is entirely destroyed, and he perishes at last in the extremity of misery.

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When the disease of the testicle has continued for some time, it often happens that the spermatic cord also becomes affected. In some instances indeed this affection of the cord takes place soon after the commencement, but most frequently not until the disease has made considerable progress, and generally not till collections of matter have been formed.

The true sarcocele being of the very same nature with a cancer of any glandular part of the body, may undoubtedly be occasioned by all those causes which are capable of bringing on that disease; but it very commonly arises or at least succeeds an induration of the testicles greatly resembling it, from a venereal infection; in which case it admits of a cure; though sometimes the *hernia humoralis*, or swelling and inflammation of the testicles arising from this cause, degenerates into a true schirrus, and proves equally destructive with the other. Instances of this kind are indeed but rare, though they certainly do occur. The constitution of the patient, however, is certainly capable of giving a malignant turn to any accidental swelling of this kind occasioned by a venereal infection; and I have observed in many cases of sarcocele from gonorrhœa, particularly in those who had a predisposition to scrophula, that an hardness remained in the epididymis,

dymis, which baffled the efforts of the most skilful practitioners, both in Edinburgh and London, until at last, after several years standing, it became active. In such patients, the body of the testicle, which had formerly been of its natural size, or nearly so, first began to swell a little, attended with pain and hardness, while that of the epididymis remained the same, or only a little painful when pressed. The disorder of the testicle, however, continued to go on, the hardness to become very great, with inequality of the surface, a vast increase of size, and severe lancinating pains darting through its substance; so that it is evident, that in subjects where the constitution is originally affected, the testicle may become at last affected, even from a slight hardness in the epididymis; but the true sarcocele for the most part begins in the body of the testicle. On the other hand, in almost all cases of sarcocele, in consequence of gonorrhœa, the epididymis is not only first affected, but remains so for some time after the swelling of the testicle is gone.

A sarcocele has by some authors been supposed to arise from an hydrocele of the tunica vaginalis; but, though it must be owned that, in some cases, the sarcocele is combined with a collection of water in this membrane, yet the primary disorder appears always to have been in
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the testicle itself. After the testicle is thoroughly diseased in this way indeed, collections of water in the vaginal tunic may be occasioned by it in various ways, either by increasing the natural secretion of the fluid by its irritation, or preventing the absorption by the contraction of the vessels appointed for that purpose. When the hydrocele happens to be the original disease, the testicle may also be considerably enlarged; but the swelling in this case is of a quite different nature from that in the true sarcocele. By long soaking in such a quantity of aqueous fluid, its vessels are relaxed, and the swelling is quite soft, without pain; nor ought we upon any account to think of extirpating a testicle in this situation.

It is indeed of the utmost consequence to distinguish properly betwixt those enlargements of the testes which are truly of a schirrous nature, and those which are not; since surgeons, by not attending to the distinguishing marks of both, the operation of castration has been frequently performed unnecessarily, nay even in some cases where the tumor was only a mere dropsy of the vaginal coat. In all cases, we may lay it down as a certain rule, that, where the disease begins in the testicle itself, we are to consider the nature of it as very different from that in which an enlargement of that part follows any collection of
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water in the tunica vaginalis. If also upon evacuating the fluid, we find the testicle much hardened, and evidently manifesting the proper symptoms of schirrus, we have then good reason to propose the extirpation of it, especially if the surface be unequal or ulcerated. We are not, however, upon any pretence to extirpate a testicle where only the epididymis is affected, because there is then always a suspicion of a venereal affection, and the words of a patient in these cases are not always to be believed; I have never observed a true venereal sarcocoele in people below thirty-eight years of age. At any rate, in cases where there is the least suspicion of a venereal taint, we are by all means first to try the gentle methods of blood-letting, application of leeches, low diet, and keeping the patient in an horizontal posture, keeping the testicle properly suspended alongst with gentle mercurial laxatives; in which way I have always found the use of mercury more efficacious than any other, whether the affection was recent or not. With respect to the probability there is of effecting a cure, indeed we must always consider the age and general health of the patient, as well as the length of time that the disease has continued. When the patient is young, and the constitution unbroken, there are always hopes of a cure, even though the symptoms should appear
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very formidable; whereas, if the patient has any appearance of obstructions in the viscera, or other glandular parts, is troubled with indigestion, and has an emaciated look, there is but little chance of rendering him any service, even though the disease should not be very far advanced. We may also judge of the nature of the disease from the progress it has made; for, where it has continued for a considerable time without advancing much, we may reasonably conclude it to be of a much milder nature than where grievous symptoms have come on soon after its commencement. In all cases we have some reason to hope for a cure, when the body of the testicle is only enlarged and hard, without any ulceration; but, where the surface is already corroded, and collections of matter formed throughout the body of it, there is evidently no other chance of saving the patient but by extirpating it altogether.

Even when this unfortunately happens to be the case, we are not hastily to proceed to the operation, without duly considering whether or not it is likely to be attended with benefit to the patient; and, that there may be a probability of success, it is necessary that the spermatic cord should not be much diseased. Indeed if the disease of the cord has proceeded no farther than the under part, so that we can certainly remove the

the diseased part of the cord along with the testicle, we may then safely proceed to the operation; but, where we are uncertain of this, the success must be uncertain also, and more especially if we have good reason to think that the disease has got within the cavity of the abdomen. In this last case, indeed, we ought not to attempt any operation; for, instead of relieving the patient thereby, we will certainly hasten his death. We must, however, observe, that in affections of this kind, the spermatic cord may be considerably swelled merely by the weight of the tumor, without any thing of a cancerous affection; or it may be enlarged from a varicose state of the vessels, or water collected in the cellular substance; but, where the surface is hard, with knots and inequalities, we may then be sure of a cancerous disposition in it; especially if it adheres to the adjacent parts, is painful to the touch, and is already ulcerated. In short, unless the cord can be so free from disease, that it can be tied and cut above the part affected, and without the ring of the external oblique muscle, there can be but very little or no hope of success.

When it is at last determined to extirpate the testicle, the parts are to be properly shaved; the patient is then to be laid upon a table of convenient height, with his legs hanging over it, and properly secured by assistants; or he may

be placed across a bed, opposite to a proper light, in the same manner; after which the surgeon begins the operation by laying hold of the scrotum in the same manner as if he was to operate on a large hydrocele. The first incision is begun at the ring, and continued to the bottom of the scrotum; dividing the skin and cellular substance at one stroke, and dissecting away the skin on one side of the diseased testicle, and on the other septum. In this way he proceeds from above downwards, laying bare the cord and testicle on each side. When the spermatic cord is thus laid bare on both sides, it is to be secured one inch at least above the diseased part, or as near the ring as possible, by a flat waxed ligature, composed of a number of threads laid by the sides of each other, and passed round it by means of a curved needle, as directed in the operation for aneurisms; after which the vessels are to be tied firmly with a running knot, and divided a little below the ligature. The cord and testicle are then to be dissected away from the back part of the scrotum, from above downwards; and this may be easily done by making use of the scalpel only. In this way no surgeon, however timorous, or otherways, will ever be in danger of exposing the other testicle by opening the septum, if he only turns the edge of the scalpel when he dissects always to-

wards the testicle, after the diseased part is removed. In order to discover the artery and vein, it will be necessary to slacken the cord, after which they are both to be secured in the manner formerly described; only taking great care not to include the vas deferens and nerve along with the vessels of the cord. To avoid this, we must previously separate them from the cord; which, for the most part, is easily done without any trouble to the surgeon, or pain to the patient. The doing this will always be attended with the happiest consequences, particularly an almost absolute exemption from pain during this part of the operation. Where the precaution just now given, however, has been neglected, I have seen the patient suffer the most exquisite pain; nay, in two instances, it was so violent, that a tetanic affection took place, which at last terminated in death. The ligature put below the cord, in order to stop the blood, is now to be left loose, ready to be tied again in case an hæmorrhage should ensue. In cutting away the ligature upon the blood-vessels, care must be taken to leave them of a proper length without the wound, so that they may be easily removed, however much the vessels may retract during the cure. As a considerable hæmorrhage sometimes ensues from the division of the scrotal artery, it will be proper to
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take it up before we tie the other vessels. After all are secured, the wound is to be healed, if possible, by the first intention; for which purpose the sides of the scrotum are to be brought together accurately, from below upwards, securing the parts always as you proceed, by adhesive plaster, laid on in such a manner as both to keep the sides of the wound and sides of the scrotum together. In this way, having at last arrived at the place where the cord was divided, the ligature is to be left out about two inches, and the sides of the wound also drawn together above the cord; the whole being secured by a linen compress and T bandage.

The patient being now laid to rest, an opiate is to be exhibited; and if, upon the second or third day, any inflammatory symptoms should take place, they are to be removed by the usual methods; such as topical blood-letting, gentle physic, and keeping the parts constantly moist with a solution of sugar of lead. Particular care must be taken that the dressings do not shift, as in that case the cure would be greatly retarded. They may be examined in five days after the operation; and if nothing has happened, they may be allowed to remain for two days longer. Indeed we may observe once for all, that in cases of extirpation of the testicles, the success of the cure depends as much on the dexterity of the
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the surgeon in dressing, as in operating. By this time commonly all the ligatures will come away, and the wound will be healed by the first intention, except here and there a small gaping in the skin, more particularly where the ligatures were. These are to be drawn together by adhesive straps as before, and dressed in the same manner; and, in this way, if the patient is otherwise healthy, the cure will be completed in fourteen or fifteen days at most. In this way I have cured four patients; all of whom were able to go abroad on the sixteenth day, without any complaint, weakness excepted.

This method of dressing I cannot help thinking greatly preferable to that commonly recommended. In the latter, after the diseased parts have been removed, and the vessels secured, a quantity of soft lint is gently to be laid into the bottom of the wound, and its edges dressed with straps of simple cerate, and after this to be covered with a piece of linen, and secured by a T bandage. The patient is then to be put to bed; and care must be taken to keep under as much as possible any inflammatory symptoms that may take place either in the wounded parts, or even in the abdomen, from the affection of the cord. This will be easily done, by attending to the methods formerly mentioned, of alleviating and removing inflammation, as, in cases of hydrocele,

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the parts here effected being the same as in that disease. Should the suppuration prove tedious, it may be greatly promoted by warm poultices, &c.; and about the seventh day the dressings will be easily removed. The wound must be dressed as formerly, every day, or second day, according to the quantity of matter discharged, till the patient be quite recovered; which generally happens, if the patient be otherwise healthy, in four or five weeks. I have dressed three patients in this manner; but in all of them the cure was not completed in less than six weeks, though I paid them the greatest attention throughout the whole course, and dressed them with my own hand. If possible to cure the wound by the first intention, it is certainly preferable; and this may be easily done, if we only take care to keep the parts in contact, and the inflammation moderate, for which the directions already given will be sufficient. Thus the patient will be perfectly free from all the danger usually incurred by exposing a great surface to the air every day or two, as well as what might arise from the absorption of the acrid matter. Neither can the patient ever be in danger from too great a discharge, if the wound be healed by the first intention; so that I must recommend it as the most safe, easy, and speedy method hitherto thought of.

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In describing the above method of curing the sarcocoele, I have only spoken of a diseased testicle; but if the skin be inflamed or ulcerated, that part must be removed along with the testicle; which will be most easily and neatly done, by making an incision on each side of it, in such a manner as to comprehend the whole of the diseased skin between the two; making both meet at the top and bottom in one straight line. After securing and dividing the cord, the diseased skin and testicle may be very easily and neatly removed together.

CHAP. X.

DISEASES OF THE PENIS.

SECTION I.*OF THE PHYMOSIS.*

IN this disease, the prepuce is contracted to such a degree, that it cannot be drawn back as in the natural state, and may be brought on by any thing capable of either enlarging the glans, or thickening the prepuce beyond their proper dimensions. In many people this disease takes place from the natural straitness of the parts, and from a natural exudation of a whitish matter between the prepuce and glans, which, when not carefully cleaned away at frequent intervals, becomes acrid, and produces such a degree of inflammation as will bring on a phymosis.

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The most frequent cause, however, indeed I might, without much impropriety, have said, the *only* one is a venereal taint. Such as are naturally inclined to the disease ought therefore to be very careful, after every suspicious connection, to wash the glans and inside of the prepuce, either with their own urine, soap and water, vinegar, spirits of any kind, a weak solution of sugar of lead, or even plain water; by which means a phymosis may almost always be certainly prevented. In a few cases, indeed, I have known a phymosis brought on by an anasarcaous swelling of the scrotum and penis, which had continued for a long time, but was at last entirely removed by the use of squills and mercury. On the subsiding of this swelling, the prepuce contracted, and at last pressed the glans so hard, that the patients began to complain that they could not void their water on account of the great stricture at the extremity of the glans. In two cases the opening was so small, that I found it difficult to introduce a large probe; and it was therefore evident that nothing but fully laying open the prepuce could be of any use, a morbid contraction having taken place over the whole of it. In other cases, however, where the phymosis originally proceeds from inflammation brought on by external causes, we ought previously to try every thing that
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seems likely to alleviate it. When the disease is slight, and of no long standing, it may be of use to support the penis up along the belly, keeping the diseased part constantly moist with the cold solution of *saccharum saturni*, giving occasionally a dose of cooling physic. Thus I have frequently removed the disease in a day or two ; but if it is occasioned by a venereal taint, which happens in ninety-nine out of 100 of the cases commonly met with, we must apply our remedies to the inside as well as the outside of the prepuce. This is best done by injection ; and I know not of any thing that answers the purpose better than a solution of sugar of lead, two grains to an ounce. By this all the matter may be washed away from the ulcerated parts, with great advantage to the patient, from the properties which the *saccharum saturni* possesses of allaying inflammation ; but if, notwithstanding this, the inflammation continues to increase, we must have recourse to blood-letting, both general and topical. If any of the veins about the affected part be so turgid that we can see them, it will be of the utmost advantage to the patient to have them opened ; and he will likewise be greatly relieved by confining himself to a low diet, with now and then a gentle laxative. But if, after all, we find the symptoms constantly increase, nothing can then be done

for the patient's relief, but to slit the prepuce up its whole length. This operation, however, simple as it may appear, is by no means so easy as we might be apt to imagine, owing not only to the laxity of the skin, but the exquisite sense of pain with which it is endowed. Plate iv. Fig. 2. represents an instrument very proper for the purpose, as the operator can very easily manage it with one hand, while, with the other, he holds the penis firm between the thumb and forefinger of the other. It consists of a very small *bistoure cache*, or bistoury concealed in the grooved directory, in such a manner that it can be introduced with the utmost ease, by reason of its extreme fineness. After this is introduced into the very back part of the glans, and bottom of the prepuce, you feel the point of it with the forefinger of your left-hand; and with the thumb of the same hand which introduced it, you now press forward the bistoury, which, if well made, will readily pierce the skin. With the same thumb you now press down the spring, which makes the bistoury appear without the groove; then drawing the whole instrument backwards, the prepuce will be instantly and entirely divided. It will be best to make the incision a little to one side, as sometimes a large vein runs immediately upon the upper part of the penis, the division of which might occasion

a considerable hæmorrhage. As soon as the operation is performed, the parts are to be well washed and cleaned; the fore being dressed with a ~~thin~~ soft lint or charpee, and the whole penis suspended in a small bag with two straps tied to it, fastened to a bandage that passes round the whole body. This bag may be sufficiently open at the under end to allow the patient to make water freely, without doing any injury to the dressing; but, if the glans be much inflamed and excoriated, we must take care, at every dressing, that some caddice, spread with ointment, be interposed betwixt the glans and prepuce, lest they should adhere together. If the patient labours under the venereal disease, however, it must be obvious that the sore will not heal until the poison be eradicated from the constitution, which cannot be done without a course of mercury; of which we shall treat more fully when speaking of the venereal disease.

I have seen some patients in which the swelling was mostly confined to the point of the prepuce, which was much thickened and contracted, so that they could not pass their water freely, nor uncover the glans to clean it. In this situation, by pulling the prepuce forward, and making an assistant press back the point of the glans, it is possible to take off the swelled part
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at once with a scalpel, which instantly removes the disease with all manner of safety to the patient. In this way I have operated on six different patients, freeing them in a moment from a very troublesome and painful affection, which could not otherwise have been removed in a long time, perhaps not at all. The dressings in this case are the same as when the prepuce is slit open. In the cure of a phymosis arising from a venereal taint, it must be observed, that though topical blood-letting may frequently be very useful, yet it ought always to be done by means of a lancet, for the bites of leeches are apt to turn into very troublesome sores.

SECTION II.

OF THE PARAPHYMOSIS.

THIS disease is quite the reverse of the former, as in it the prepuce is drawn quite back behind the glans, and cannot be brought forward. Like the phymosis, it arises most frequently from a venereal infection, but differs from it, as in the phymosis the prepuce is commonly more swelled than the glans; while in the paraphymosis it is principally owing to the enlargement of the glans that the prepuce cannot be retracted.

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Fig. 3.

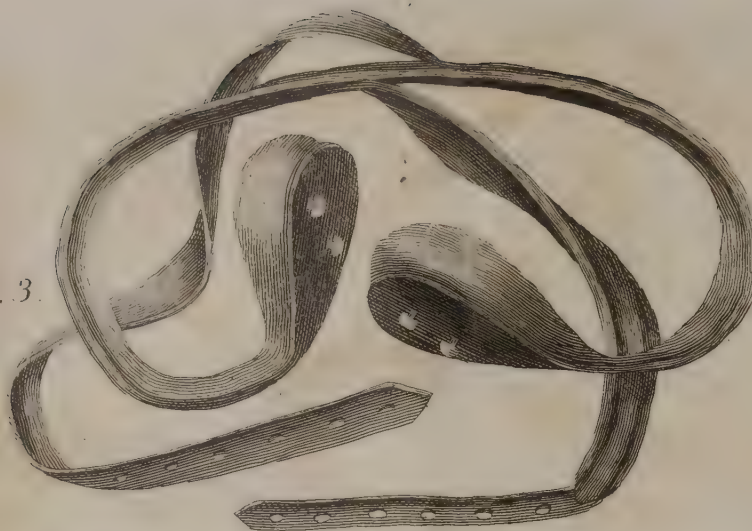


Fig. 3.

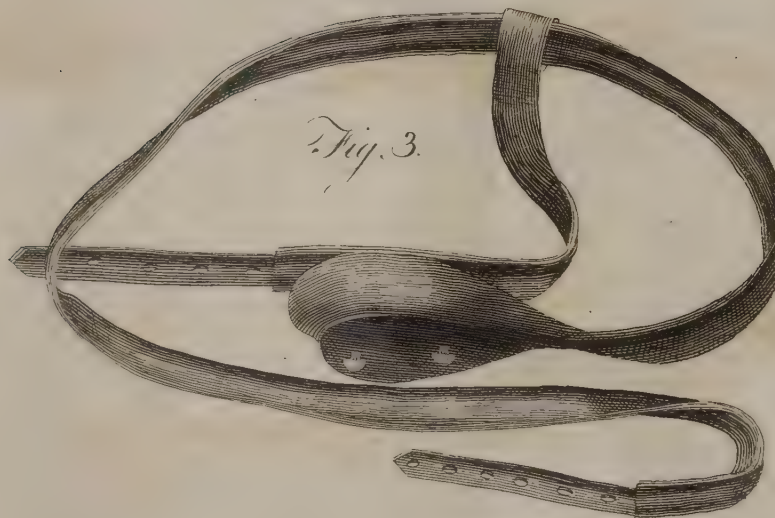


Fig. 2.

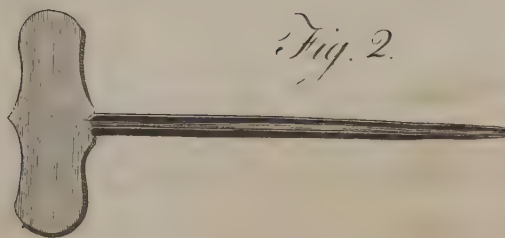


Fig. 1.







BACK OF FOLDOUT

Those most subject to paraphymosis are, 1. Such as have the glans entirely covered by the prepuce, and frequently pull back the latter to clean or examine the parts, after they have got a venereal taint. In such people, if the prepuce be not soon brought forward, the vessels on the surface of the glans may be so compressed as to stop the blood in them, and of course augment the size of it, so that the prepuce cannot be easily returned. If this be frequently done, it may become difficult, and at last impossible, to bring it forwards, on account of the pain it occasions. 2. Young boys about six or seven years of age frequently bring a paraphymosis upon themselves, by retracting the prepuce in diversion, until they become unable to pull it forward again. As they generally conceal this for some time through fear, it is not uncommon for the parts to become inflamed and swelled to a great degree; and I have even found gangrene taking place before the matter was found out. If, however, the surgeon be called in time, he may not unfrequently relieve the patient at once, by laying hold of the penis at the part where the stricture is behind the glans, with the fore and middle fingers of each hand, and gently push back the glans with both thumbs, while he attempts to bring forward the prepuce slowly and gently with the fingers. In this way I have succeeded.

ceeded a great many times when the affection was recent; but, if it has continued for any length of time, and the parts are much swelled, we must not attempt to relieve the patient in this way. The size of the glans is to be reduced as quickly as possible, by employing all the remedies most powerful in checking inflammation. As the immediate cause is a compression of the veins, we are to empty them by applying numbers of leeches to the glans, and promoting a quick flow of blood by immersing the penis in warm water. This will frequently reduce the size of the parts so much, that the prepuce may be brought forward; but, if this should fail, we may try the effects of cold applications; but, should the size of the parts still continue to increase, and an œdematous swelling appear on the under part of the prepuce about the frænum, no application whatever can be of any use in overcoming the stricture, and we can only relieve the patient by an operation. In this case, the surgeon, with a small round edged scalpel, represented plate iv. fig. 3. is to make a pretty deep cut on each side of the penis, immediately behind the glans, and of such a length as completely to cut through the whole stricture. Here the small scalpel is undoubtedly preferable to every other instrument, and answers the purpose much better than the shoulder of a lancet, which some
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have recommended. The wounds must be allowed to bleed freely ; after which a pledget spread with emollient ointment is to be laid over them, and an emollient poultice over the whole. In the course of a few days the swelling will be entirely removed, and the parts will soon heal, unless there be a venereal taint, and this cannot be removed but by a course of mercury.

SECTION III.

OBSTRUCTIONS IN THE URETHRA.

THESE very often take place in such as have been severely infected with the venereal disease, and are supposed to proceed from caruncles, or small fleshy excrescences within the canal. But, though it cannot be denied that such caruncles sometimes exist, yet they are by no means so frequent as is commonly imagined. In many instances, where the suppression has been thought to arise from this cause, it has been found, upon dissection, that none existed ; so that many of the best practitioners are now of opinion that caruncles are very rarely met with in the back part of the urethra, though not unfrequently within half an inch, or a quarter of an inch
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of the point. In such cases, they have uniformly been found of the same nature with the warts which grow on the prepuce in venereal patients; and, even in those who have caruncles of this kind, there is scarce any well authenticated account of their having been found far up the urethra. Daran indeed gives a great number of instances where the urine was obstructed by caruncles; and from him succeeding practitioners seem to have imbibed the opinion so much, that there is now scarce any obstruction of urine succeeding a gonorrhœa which is not attributed to a caruncle; but, from a careful perusal of Daran's work itself, it is evident that he has been deceived in his observations, and frequently mistaken the obstructions arising from constrictions succeeding inflammation, old ulcers, or their hard cicatrices, for caruncles.

When these obstructions do really occur, they are either of the nature of the warts already mentioned, or proceed from constrictions, or ulcers; the latter being sometimes of the same nature with those called *chancres*, and sometimes only the consequence of long continued inflammation of the urethra from gonorrhœa or gleet; and even these are much more frequently met with towards the extremity of the urethra than towards the back part of it; it being rarely found that they occur farther

back than an inch or two from the point. But, 3d, perhaps the most frequent causes of obstructions in the urethra are cicatrices of old ulcers, or contractions of the canal itself, by astringent injections improperly applied. 4. Tumors in the urethra, or parts adjacent, frequently obstruct the canal in the most complete manner, so that sometimes the sides of it have been found quite grown together, and the canal entirely obliterated, from the long continuance of the sides in contact with one another; but, in all cases of this kind, it has also constantly been found that the urine has forced itself a passage some other way. 5. The enlargement or thickening of the spongy substance of the urethra itself may be accounted as frequent a cause of obstructions in this canal as any whatever; and sometimes these enlargements have been found not confined to one particular spot, but seated in different parts of the canal, with intermediate spaces perfectly free from any disease.

There is no remedy which proves more universally useful in obstructions of the urethra, whatever cause they proceed from, than *bougies*; always observing, however, that, where the disease proceeds from a venereal infection, means must be used for removing this cause before we can have any hope of effectually curing the lo-

cal affection. It is probable that these remedies act more by their mere mechanical pressure upon the contracted parts, or caruncles, than to any specific virtue in the ingredients of which they are composed. It has been indeed strenuously argued, that they prove useful from their suppurative or caustic quality; but these properties, if they have any such, must be supposed rather hurtful than otherwise, as, by inducing an high degree of inflammation, they must be apt to produce obstructions, rather than to remove them; and, as to the notion of caruncles being the most frequent causes of obstructions in this part, it is most certainly erroneous; nor, though it were just, could we be certain that it is possible to remove them by suppuration, as we have no example of the removal of tumors or warty excrescences in other parts of the body by suppuration only. Indeed, if the urethra should happen to be obstructed by a tumor which can be brought to suppuration, the disease may thus be effectually cured; but it is evident that this cannot be ascribed to the operation of a bougie, or any other remedy, but to the nature of the tumor itself.

M. Daran, and others, who wished to raise their reputation by inculcating a notion that the bougies they made use of were composed of certain ingredients, which had some kind of
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specific virtue capable of removing the obstruction; and this idea having been received upon their word, the pernicious practice has also been introduced of composing them of acrid and escharotic materials, whereas they ought undoubtedly to be made of such as are mild and unctuous, incapable of irritating or producing inflammation. A composition of simple diachylon, plaster, oil, and wax, answers the purpose at least as well as any thing that has yet been invented. Having melted the wax in the oil, and poured into this mixture the diachylon, melted also in another vessel, we are to dip into the composition pieces of fine old linen, covering them with it as equally as possible, using a warm spatula to smooth it, should any inequalities take place on the surface, and, after it is cold, forming it into bougies. The pieces into which the cloth is cut ought to be nine, ten, or eleven inches in length, and rolled up in such a manner that the part which is to enter the urethra be smaller than the rest. After having rolled them up as neatly as possible between the fingers, they must be polished by rubbing them with a piece of smooth wood on a polished marble slab; and lastly, before it is attempted to introduce them into the urethra, they are to be well covered with oil. The surgeon then, taking hold of the penis firmly with one hand, is to introduce in-

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to the urethra the small extremity of the bougie, and gently push it forward until it meets with the obstruction; and, if it cannot readily be made to pass, we must not attempt to push it violently, but immediately withdraw it; and, next day, or at some convenient interval afterwards, try to introduce another bougie, with a smaller point. It is indeed a matter of some difficulty to determine the due degree of force which ought to be applied in the introduction of bougies; for, though too much violence will undoubtedly hurt the patient, yet, unless a due degree of force be applied, it is impossible that the remedy can be of any service. It is always, however, to be remembered, that though we do not succeed in one attempt, we may at another; and therefore we are by no means to consider the case as desperate, though we should fail in two or three trials at first. Indeed it will seldom happen that the point cannot ultimately be accomplished by perseverance, even if the urethra should be totally obstructed in some particular point. The best method of attempting to make the bougie pass, is by gently moving it round between the finger and thumb, pressing it gently forward at the same time; for thus it acts like an auger, or boring instrument, making its way gradually, without violence or detriment to the patient. In very firm obstructions, it may be
necessary

necessary to have the bougies made of stronger and more compact materials than those above recommended. Catgut spread with plaster, as directed, or even catgut alone, will form bougies sufficiently firm for opening almost any obstruction that may occur. We must observe, however, that sometimes when the obstructions are removed, and the bougie has passed them all, it is apt to penetrate too far into the cavity of the urethra; perhaps to slip into it altogether, or even into the bladder itself. To prevent this, the end of the bougie ought always to have fastened to it a piece of tape, or soft string of some kind or other, by which it may be pulled out again whenever it is thought necessary to remove it.

No certain directions can be given concerning the length of time requisite for bougies to be kept in the urethra, as this can only be determined by certain circumstances which it is impossible to specify. At all times, however, when they give much pain, it will be proper to remove them for a day or two, and not to make use of them but at very considerable intervals; but still we must remember that it is only by mechanical pressure that they operate; and therefore the fewer intermissions there are in their use, so much the better, and the sooner the cure will be completed. For this reason
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also, they should be gradually augmented in size, until we are certain that one is introduced capable of removing any obstruction we can suppose to exist in the canal. In general they ought to be continued, not only until the patient feels no more difficulty in making water, but for a considerable time afterwards.

Sometimes it may be necessary to introduce into the bladder an instrument of the nature of a bougie, but hollow. When this is to be done, a flexible catheter ought always to be made use of instead of a bougie, as there is danger of some of the composition spread on the latter falling into the bladder, and thus proving the nucleus of a stone. A very convenient method of framing a flexible catheter is by means of a silver wire, wrapped in a spiral, round a steel probe of a proper bigness, which being properly covered with a piece of fine linen spread with bougie composition, and the probe withdrawn, forms an instrument capable of serving all the purposes both of a bougie and catheter. The same objection, however, lies against leaving this long in the bladder as against a bougie, *viz.* that part of the composition may fall off. When a flexible catheter therefore is to be left in the bladder for a considerable time, it will be proper to make use of one made of elastic gum, which is

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not apt to crack or fall off as the composition we speak of.

Though hitherto we have considered bougies as acting entirely by their mechanical pressure, yet in certain cases we know that they may likewise act by their medicinal virtues, as in the case of chancres or venereal ulcers. When there is a suspicion of any of these taking place in this canal, the bougie is to be well anointed with the common mercurial ointment every time it is introduced. This will be found completely to answer all the purposes of what authors have called mercurial bougies. I have found that, in some cases, when the bougie was anointed with one part of citrine ointment well mixed with three parts of axunge, that it answered all the purposes of the more violent mercurial applications, without any of their bad qualities.

As these obstructions in the canal of the urethra arise most frequently, if not always, from venereal infection, it will very generally be proper to put the patient under a course of mercury, while the use of the bougies is continued. The bougies will also be serviceable in those troublesome gleets which are sometimes occasioned by a relaxed state of the vessels, at other times from excoriations; and they have often been found to remove these complaints when the most powerful injections have failed.

Obstructions

Obstructions in the urethra are no less frequent in women than in men, and are to be removed in the same manner. In females, however, it frequently happens that tumors occur of such a size as can be removed effectually only by the scalpel or ligature. This is done with more safety in them than in men, by reason of the shortness and wideness of that canal in women, insomuch that there are instances of tumors adhering even to the bladder itself being taken away without injury to the patient. To do this it is necessary to lay open the urethra, taking care not to wound the vagina, after which the tumor may be pulled down and extirpated by the application of a ligature. As long, however, as the passage of the urine is not totally obstructed by them, it will be proper to let such tumors alone ; and indeed, at any rate, it will be better to have recourse to the knife or ligature, rather than to caustic or escharotics, which cannot be applied without great danger of injuring the adjacent parts.

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SECTION IV.

OF THE AMPUTATION OF THE PENIS.

WHEN in any case the penis comes to be so much diseased that the disorder will not yield to any remedy, amputation then becomes necessary. This particularly happens in cancerous sores, or in mortifications from neglected paraphimosis, or any other. When the amputation is to be performed, the operator begins by making an incision all round in the sound parts a little beyond those where the cancer or mortification is seated. The skin being then drawn back as much as possible by an assistant, the whole body of the penis is to be cut through at one stroke. The arteries are next to be taken up by ligature according to the directions formerly given; but if an oozing of blood should still remain after all of them are taken up that can be seen, the parts may be dusted with a powder made of very finely scraped agaric, with a small proportion of white sugar pounded very fine, or of gum Arabic. This being applied, and the parts exposed for a few minutes to the air, the hæmorrhage will stop. To allow the patient to make water freely after the amputa-

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tion, it will be proper to introduce the silver canula, represented plate 4. fig. 4. and keep it there by means of ligatures put through the two small openings on each side of it, represented in the figure by B. B. These ligatures are to be tied to a bandage put round the body; the fore is to be dressed with charpee kept in its place by a piece of linen, having in it an opening exactly of such a size as is sufficient to let the canula just mentioned pass through it, and to appear freely without the dressings. The whole are to be kept on by a small roller passed five or six times round the penis; and, if there should still be any discharge, it may be very effectually stopped by tightening the bandage so as to compress the penis upon the instrument. In this way the patient is to be dressed every day, or every other day, after the first dressings have been removed. These probably may not come away very easily for the first four days after the operation; but it will not now be necessary to compress the penis any more upon the canula, the latter being now only useful for keeping the dressings dry, and the patient comfortable, the discharge of blood being already stopped. The wound for the most part will be quite healed in eighteen or twenty days.

In this way I have operated on four patients; but it is necessary to observe, that, before any
operation

operation is attempted, the surgeon ought to examine with the greatest accuracy whether the disease be in the penis itself, or only in the skin, which may be easily known, by laying open the prepuce, and examining the glans. If the frænum happens to be too short, cut it with a pair of scissars, and dress the wound with a little charpee.

In children it sometimes happens that the urethra is imperforated, the urine proceeding along it only to a certain point, where it stops. In such cases we must introduce a small trocar, exactly in the direction of the urethra, till the urine be discharged; after which the passage is to be kept open by the introduction of bougies; if any opening, however, can be found which allows the urine to pass, it will be most proper for some time to allow the patient to remain as he is.

CHAP. XI,

OF THE STONE IN THE BLADDER.

THIS is one of the most deplorable of all the diseases which affect the human body, being not only attended with the most excruciating
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torment the human faculties are capable of enduring, but scarcely admitting of any cure, except by a very difficult and painful operation, which, in certain cases also, is not able to afford relief, but brings on death more speedily than it would have taken place otherwise; nor are the symptoms of the stone always easily to be distinguished from those of other diseases, or is the surgeon able to determine, without difficulty, whether it be proper that the patient should undergo the operation or not.

The causes by which this disease is brought on are difficult to be investigated; and, though we fully knew them, there is little reason to think that the disease could thereby be much more easily prevented or cured; we shall therefore at present omit any disquisition concerning them, deferring any inquiry of this kind till we come to treat of the chemical properties of the urinary calculi, and the various solvents by which they may be affected. The symptoms generally come on gradually, and are augmented, though not always, in proportion to the size or inequalities on the surface of the stone. One of the first is an uneasiness at the extremity of the urethra, for some time perceptible only just after making water, or after the patient has been using violent exercise. This uneasy sensation gradually increases, along with a strong inclination

tion to make water, without an ability to do so with any freedom, infomuch that it frequently comes away by drops. Sometimes it will run in a full stream, and suddenly stop, when the inclination of the patient to void it continues in its full strength; and, at such times, nothing but a change of posture can give any relief. That which more particularly gives him ease is the elevation of the pelvis, by which the stone falls back from the neck of the bladder. Besides this uneasiness which takes place only at intervals, the patient, if the stone be large, has a constant dull pain about the neck of the bladder, frequently attended with a very troublesome tenesmus. Being worn down with excessive pain, and its natural consequence the want of rest, his health becomes at last most grievously impaired, and he labours under a complete dyspepsia, which it is hardly in the power of medicine at times to remove; and, what is worse, the operation, when performed, when patients are affected to any high degree in this way, always proves fatal. In this disease the urine is sometimes clear, sometimes thick, and depositing a mucous sediment, but frequently tinged with blood when the disease is very violent. All the symptoms are greatly exasperated, and the paroxysms rendered much more frequent and dangerous, if the patient happens to use violent
exercise

exercise of any kind, particularly by riding on horseback ; but, notwithstanding the extreme anguish endured by the patient from this disease, which one should think might sufficiently characterize it, there is not one of the symptoms just now enumerated which can, with absolute certainty, determine the nature of the complaint. Of this we can only be ascertained by the patient's voiding small stones or fragments with his urine ; or, with certainty, by the operation of founding, to be afterwards described.

The symptoms above mentioned, when they are not occasioned by a stone, may originate from an ulcer, either in the neck or body of the bladder ; from tumors in the neighbouring parts ; from stones in the kidney, or in the ureters. These last indeed, are for the most part attended with great pain in the back, sickness, nausea, and vomiting ; but, as these do not always occur, there must in some cases be an uncertainty, as the other symptoms produced by them greatly resemble those produced by the stone in the bladder. All the symptoms above described may also be produced by a suppuration in the kidney ; the matter collected in the pelvis passing through the ureter, and by its acrimony irritating the neck of the bladder, in the same manner as is done by a stone, or by a very great collection of sand, which sometimes produces inflammation and suppuration at the neck of the bladder

bladder from the great irritation ; so that, in all cases where no stones or fragments have been voided by the patient, we must have recourse to the sound or catheter.

The catheter is an hollow instrument usually made of silver, and of the shape represented plate 5. figs. 1. 2. 3. 4. ; but, for discovering a stone, it is better to use a solid instrument of steel, on account of the superior hardness of the metal. This is called a sound or staff, and, for men, ought to have such a curvature as is represented in the figure, being nearly the natural curvature of the urethra ; but, in women, a straight instrument may answer the purpose, as in them the urinary canal is much straighter and wider than in men. A surgeon ought always to be provided with sounds of different sizes and curvatures.

When the operation of sounding is to be performed on any person, he must be laid upon a table, or a bed, with his feet hanging over the edge ; a sound adapted as much as possible to the size of the patient's urethra must be chosen ; and, before we attempt to introduce it, it is to be warmed in water to the heat of the body, and then anointed with oil or butter. Having separated the legs of the patient, the surgeon then takes hold of the penis in his left hand, and drawing it gently towards the umbilicus, enters the sound with the concave part towards the patient's belly, and the convex towards himself.

The instrument is then gently pressed downwards, without raising the hand; but, if he has happened to draw the penis too tight, a resistance will be found about two inches from the point, owing to the staff's being pressed upon the pubes. In this case the penis is to be slackened a little, and the staff will almost of itself go down immediately, and make a turn. Its new motion is to be humoured by the operator, who is still to keep the penis in the same degree of tightness, bringing it with the left hand gently forward upon the staff; when, in most cases it will, with the greatest ease, and almost of itself, slip into the bladder. Should it happen to do otherwise, however, it is to be withdrawn, fresh oil applied, and the introduction again attempted, keeping the penis gently tightened, that all parts of the urethra may be drawn equally round the staff, when it will be found readily to enter the bladder at once. Sometimes the instrument stops at that part of the urethra which is surrounded by the prostate gland; and, as the part of it which lies immediately before that gland is quite membraneous and unsupported, there is danger, if much force be used, of pushing it through the urethra entirely, at the opening by which the seminal ducts enter. To avoid this, it has been directed to introduce the finger, first well oiled, into the rectum, and with it gently to elevate the point of the staff, in order to
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make it enter the bladder more easily. But for this there never can be any real occasion in a healthy state of the neck of the bladder, it being impossible that any perforation of the urethra by such a blunt instrument can take place without a considerable degree of force; though, I am sorry to say, that blunders of this kind do frequently happen among practitioners. These, however, could never take place, would they make the experiment first upon themselves, in order to determine with what ease it might be done; or would they behave towards their patients with the same delicacy that they would do to themselves. Were this the case, they would find, that, in a healthy state of the urethra and bladder, the staff passes into the latter without the least pain; and whatever degree of pain the patient suffers must be from inattention on the part of the surgeon. There are indeed some states of the urethra in which it is impossible to introduce a staff; but these arise entirely from disease, and shall be afterwards treated of. In general, in this operation, there is no possibility of an attentive surgeon once misgiving, or giving pain to his patient.

Having introduced the staff into the bladder, the surgeon is to take firm hold of it between the thumb and two first fingers of his right-hand, keeping in mind at the same time the shape of

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the bladder and curvature of the staff. By attending to these particulars, he must at first sight observe, that, by gently pressing the staff downwards towards the rectum, and changing its position every time it is moved, and keeping it gently moving from one side of the pelvis to the other, he must at last hit upon the stone, if any such is in the bladder, unless the size be much less than is capable of passing through the urethra. It has been directed by some surgeons to move the point of the staff from side to side in the bladder; but thus it is evident, that the the fore and upper part next the fundus could only touch it. If the bladder contains only six ounces of water, the stone, by reason of its weight, and from the distension of the bladder with the water, will always be found at the neck, and, in the way just now directed, will be exactly under the staff when introduced, and be struck by it very distinctly. Should it happen, however, that, at the time the surgeon is to sound the patient, the latter labours under a violent fit of the stone, (indeed it is commonly at this time only that assistance is called for), in this case, by reason of the excessive irritation which takes place, the poor man can hardly retain his urine for any time; so that the bladder at this time must be in a constant state of contraction; and, for this reason, the
stone

stone must always be forced to that part of it, to which, by its formation, it is known to contract itself. And, from the anatomy of the parts, we know that the muscular coats of the bladder can contract themselves in every direction, so that the fundus of it may be brought into contact with the neck, in order to expel the contents, and the sides of it also with one another. This being the case then, on the introduction of the staff, the stone will always be felt at these times by the point only on its entering the bladder, but not afterwards, without great attention; because, from the little resistance the bladder makes when not distended with urine, that viscus itself may be elongated, by the pressure of the staff, in such a manner as to resemble a gut with a blind end, rather than any thing else. The stone will, in this state of parts, be carried by the point of the staff to the fundus of the bladder. Even in this case, indeed, it will still be felt by the very point of the staff; but the small size of this, not exceeding the eighth part of an inch in breadth, can give but a very indistinct stroke, which is far from being the case when the bladder is distended with water, and the stone lying at the neck of the bladder, and immediately above the rectum.

From what has already been said, it must now be evident, that the surgeon, in all cases where, from the severe fits of the stone, the bladder is empty, or nearly so, ought to move the point
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of the staff pretty briskly forwards and upwards, to strike the stone with any tolerable degree of certainty; and, as the point of the instrument may pass on each side, or above or below the stone, it will be necessary for him to make it roll a little in his hand at this time, that the side of it may come in contact with the stone, and he will then feel it distinctly by the rubbing of the hard metal upon it. It is recommended by surgical writers, to cause the patient change his posture, by standing erect, or lying forwards in this position, &c. ; and this indeed may be tried without any detriment, should the methods just mentioned prove unsuccessful; but I must confess, that, in all I have founded, I never found occasion to raise a single patient into an erect posture, or to move him from his back. Some have mentioned a stone contained in a cyst; but of this I have no idea that any such thing can take place. Were it so indeed, and were the cyst near the fundus of the bladder, or in either of its sides at a small distance from its neck, the symptoms of stone would cease to be troublesome. It is indeed by no means uncommon for the stone not to be distinctly felt at the first; but, by attending to the directions just now given, I have never missed it once; and, by proper caution and perseverance, I do not think it ever can be missed; for the sensation communicated, by touching a stone in the bladder with the staff, is so different from
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that of every other rub or stroke which can take place in those parts, that I think it can never be mistaken by any person in the smallest degree versant in his business, or who has attentively considered what he is doing.

Having ascertained the nature of the disease by sounding the patient, the next thing to be considered is the method of cure; and here I must own that I know only of one, and that is by the operation; for, as to any effect from lithontriptic medicines taken by the mouth to dissolve a large stone, I never saw them beneficial; nor do I think they ever can be so; because their mixture with the fluids of the body must dilute them to such a degree as to destroy their power entirely. Neither have they been attended with any better success, who have attempted to dissolve the stone by injecting lithontriptic fluids into the bladder; for these, if diluted to such a degree as to have no effect upon the bladder, will have as little upon the stone; and, if sufficiently strong to dissolve the stone, will at the same time inflame the bladder to such a degree, that the fits become not only very frequent, but exquisitely severe; so that it is necessary to have recourse to venesection, cluniluvium, or buttock bath, emollients, injections, and anodynes, to allay the tumult which has been raised. In short, though there are several chemical solvents by which the
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human calculi may be dissolved out of the body, and though, by means of medicines taken by the mouth, and supposed to be *lithontriptic*, some patients have felt considerable ease, yet this must be accounted for upon a principle quite different from that of having any power to dissolve the stone in the bladder; for there is not a single instance of a stone being ever thoroughly dissolved after it was formed in the human body. The operation, therefore, is the only thing we can depend upon as a certain cure in this disease; and the success of it depends very much, not only on the dexterity of the surgeon, but on the general health of the patient. When this last is so far gone, that he complains of constant sickness and oppression at stomach, with nausea, and an inclination to vomit, particularly at every time that he takes food, being at the same time distressed with a great degree of flatus in his stomach, constant thirst, and the pulse from 96 to 100, and, at the same time, he labours under a severe fit of the stone, it would in this case be very improper to advise any patient to undergo the operation, as the loss of blood he must necessarily sustain from it would undoubtedly increase the dyspeptic symptoms he now labours under to such a degree, that he could neither receive nor retain the food necessary for supporting him during his illness. In such a situation, the surgeon ought first to attempt to relieve him from the dyspepsia,

fia, as well as the other severe symptoms; which can only be done by gentle tonics, and anodynes, &c. ; and as, in such cases, the belly is almost always costive, particular attention must be paid to that complaint, and the patient never allowed to remain above two days at the utmost without a stool. The easiest method of removing this symptom I have found to be, by mixing half an ounce of castor oil with about two tea-spoonfuls of gin, brandy, or any other good spirit, and giving it every second night, or at any time when necessary. If this should not agree with him, four drachms of Rochelle salt, dissolved in tea, may be given in the morning with good effect.

Another case, in which no patient ought to be advised to undergo the operation for the stone, is when he labours under a severe paroxysm of the disease. Often, in this situation, an inflammation of the coats of the bladder takes place from the severe and repeated contraction of that viscus, as well as of the whole abdominal muscles, in order to discharge its contents, particularly from the internal coat being so frequently and forcibly pressed against the calculus. Thus the irritability of the bladder, and the disease itself, are augmented to such a degree as even to produce a suppuration ; for it is not unfrequent to find matter in the urine of such patients as have laboured under long and severe fits of the stone.

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By frequent repetition and continuance of these, also, the coats of the bladder itself become thickened, and its capacity diminished to a great degree, infomuch that it can contain little else than the stone itself. This last circumstance may be distinguished by an expert practitioner in the following manner: On introducing the sound, it will stop after it has passed the sphincter of the bladder; and, instead of going into it easily, will require force to press in the whole curvature of the instrument. This is never the case when the coats of the bladder are in a healthy state; but, when diseased in the manner just mentioned, the pressure of the staff, however gentle, gives the patient most intolerable pain; nor can you move the instrument in any manner of way, without putting him to the most exquisite torment; so that in no case of this kind can we suppose that a judicious practitioner would venture on an operation.

Chirurgical writers have observed that children suffer less from this operation than others, and that even old men recover more readily than such as are in the vigour of life; but I am inclined to think that the differences observed in this respect are to be attributed more to the dexterity of the surgeon than any thing else. In nine cases out of ten, the whole operation may be finished in no longer space than ten minutes

minutes at most. Now, if the surgeon, after having made his incisions, and has fairly introduced his forceps into the bladder to extract the stone, shall search for it a quarter of an hour before he can lay hold of it, and then lose the hold he has got, once, twice, or thrice, and every time be nearly as long before he can find it again, so that the patient may be half an hour, an hour, one hour and an half, or two hours under his hands, it is evident that the danger must in every case, of whatever age they are, be in proportion to the injury sustained through the unskilfulness and tediousness of the surgeon. And as in children, all the vessels yield much more easily to the impetus of the circulating fluids, on this account, therefore, in those we more seldom find the same degree of inflammation from the same degree of injury done. In young plethoric habits, when the body is come to its full growth, and when, if we may be allowed the expression, the balance of the system is equal, or nearly so, the bladder can much less easily bear any considerable injury than in childhood; and the tendency to inflammation and mortification will be much greater in proportion to the injury done in them than those. In old age again, the balance of the system is in a manner reversed; the arteries are stronger in proportion, or less dilatable than the veins, and, of con-

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sequence,

sequence, the inflammatory symptoms seldom rise to such an height in men past the meridian of life, as in younger subjects. But in any time of life it is improper to perform the operation for the stone in the following cases. 1. When the patient labours under a great degree of dyspepsia. 2. In very severe fits of the stone, and those so long continued that the coats of the bladder are thickened. 3. When the bladder is ulcerated, particularly if the patient is old, and much debilitated, and the discharge of matter very great; but, where this is not the case, we cannot have a dependence on any remedy besides the operation, and; if the surgeon performs his part with dexterity, we may be almost certain of success.

The parts on which the operation is to be performed are known to every anatomist (and I hope no other will attempt it), to be only two; viz. immediately above the pubes, in that part of the bladder, which, when fully distended with water, is not covered with the peritonæum, or in the perinæum, by laying open the neck and lateral part of it, thus making an opening into the bladder itself, from its neck as it is called, of sufficient magnitude to allow the stone to be extracted. Some attempts indeed have been made to perform the operation by cutting into the posterior part of its neck, or at once into the body of it; but in this case there is great danger of wounding some of the intestines, or
other

other parts essentially necessary to life. Even in the present improved state of surgery, there is some danger of this; as Mr Bromefield mentions a patient on which he performed the lateral operation, in whom a considerable length of the small intestines protruded immediately at the wound, though no bad accident happened from such an alarming circumstance. This protrusion of the bowels is more apt to happen in what is called the High Operation for the stone, than in any other, and is therefore a strong objection to it; however, as in some cases it is not only highly proper, but the only one by which the patient can be relieved, we shall here describe particularly the method of performing it, with the advantages and disadvantages attending it.

SECTION I.

OF THE HIGH OPERATION.

As in this operation the bladder is to be cut, not at the neck, but at a considerable distance from it, near the bottom, and as the bladder itself naturally contracts into a small bulk when empty, there is no possibility of operating in the
method

method we now treat of, but when that viscus is distended either naturally or artificially. In such patients, therefore, as have the bladder diminished, so that it is not capable of containing near two pounds of water, the high operation ought never to be attempted. When it is thought proper to perform it, some practitioners have advised the patient to accustom himself gradually to retain his water as long as possible, lengthening the time of this retention even to ten or twelve hours, and making a ligature upon the penis to prevent its escaping; but, considering that one of the most troublesome symptoms of this distemper is a continual desire of making water, and that the retention for any length of time cannot be accomplished naturally, it surely must be accounted very cruel to subject the patient to violent torment for so long a time, by putting him in a situation in which he cannot evacuate it. Nay, to complete the absurdity of this direction, the unfortunate patient is desired to drink plentifully all this time that a ligature is made upon the penis. But, let any one judge how this could be borne, even for a few hours, by a person in health, when drinking plentifully of any diuretic liquor; much less then surely could it be endured by one who is continually tormented with a desire of making water, even when he drinks nothing. By
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far the best way, therefore, is to distend the bladder artificially, by blowing air into it, or rather injecting warm water; as the latter can be done much more gradually, and the admission of a great quantity of air into any of the cavities of the body, where naturally none is contained, must be attended with dangerous consequences. Objections have been made to this practice, on account of the danger there is of bursting the bladder; but this cannot happen if the injection be performed with sufficient caution; and a considerable time, as half an hour, or one hour taken to distend it; if the operator indeed, through ignorance or impatience, takes only a few minutes, there must be great danger of accidents, and there are several instances on record of the bladder having thus been burst, and the patient destroyed.

Having gone through every necessary preliminary, the patient is to be placed upon a table about three feet and an half high, with his breech raised considerably higher than his head and shoulders, that the bowels may fall away from the bladder, and thus be in no danger from the operation, and likewise that the stone may fall towards the fundus of the bladder, and thus be easily found and extracted, when an opening sufficiently large is made. The patient is to be firmly secured on the table, his legs and arms
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being held by the assistants. The operation is to be begun by making an incision with a scalpel upon one side of the linea alba, beginning about three or four inches above the ossa pubis, continuing the incision down to the pubes, through the skin, cellular substance, and tendons of the oblique muscles. This being done, the pyramidales come in view, and these are to be carefully separated, as well as the recti. The separation ought to take place from the pubes upwards, as here the bladder immediately presents itself uncovered by the peritonæum; so that if the operator has been careful in dividing the muscles as they ought to be, there cannot be the smallest danger of penetrating the cavity of the abdomen, by wounding the peritonæum. The surgeon, with an abscess lancet, then makes an opening directly into the body of the bladder; into which, as soon as he perceives the urine to flow, he introduces the forefinger of his left-hand, and immediately causes his assistant remove the ligature from the penis, that the bladder may be completely evacuated. He then introduces upon his finger the probe-pointed straight bistoury, and dilates the wound in the bladder at least three inches; after which, either with his finger, or a pair of straight forceps, he lays hold of the stone and removes it. The opening in the bladder is to be made directly

rectly in a line with its neck, or a little to one side. In this operation the stone ought to be extracted with the fingers only, if it can be done, but if not, the forceps are to be used. It is seldom broken even when these are made use of, unless by the rashness of the surgeon; but should it so happen, the whole of it is to be removed by the fingers. When this is completely done, the upper part of the wound is to be brought closely together by means of the twisted suture, and a small opening left immediately above the pubes to discharge any water that may happen to come that way. There would indeed be no impropriety of keeping open the whole wound in the integuments, until that of the bladder was healed, were it not for the danger of the bowels being protruded, as having in that case no support but the peritonæum. After the operation the patient ought to be put to bed, with his head considerably lower than his breech; and is to be kept cool by gentle laxatives, and other remedies of the antiphlogistic kind, as occasion may require.

The high operation is principally of use for extracting large stones of ten ounces weight or more; and these may be always distinguished, if the operator introduces his finger into the anus in order to examine their size and weight. Stones of this size can be extracted with more ease by
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the high operation than any other, because the parts where the incision is made are quite soft, and there is no danger of bruising them against a bone, which sometimes happens in the other methods of cutting. Another advantage likewise attends this mode of operating, viz. that there is less danger of any fistulous opening taking place, as the wound is made at a distance from the neck, which is not the case when incisions are made in the perinæum. The disadvantages attending it, are, 1. The danger of wounding the peritonæum, and occasioning a protrusion of the bowels. If the operator, however, proceeds with caution in the manner above directed, there can be very little chance of such an accident happening. 2. There is danger of the urine being diffused in the cellular substance which lies between the peritonæum and abdominal muscles, and between the bladder and pubes; in which case, it is apt to produce sinuses, and occasion great distress to the patient. This takes place in case of inflammation about the neck of the bladder, which frequently happens after the high operation has been performed; and the only way to avoid it, is to keep the patient low by laxatives, cooling diet, &c. in order to prevent the inflammation, or make it as little as possible. 3. In the high operation, it has been remarked, that the wound,

both in the bladder, and in the external integuments, is much more difficult to be healed, than in any other way of operating, and particularly if the constitution of the patient happens to be any way deficient. 4. It has been observed, that few patients above the age of thirty recover after this operation; but this, in all probability, is owing more to the injury done during the operation by the unskilfulness or inattention of the surgeon, than to the operation itself. However, unless in the cases already mentioned, where the stone is very large, I never advise nor practise it.

SECTION II.

OF THE LATERAL OPERATION.

WHERE the stone is of a moderate size, attended with other favourable circumstances, this mode of operating is to be preferred to any other. The patient, if young and healthy, ought to lose some blood, and to use the warm bath two or three times before he undergoes the operation. It will be sufficient for him to be immersed in warm water for half an hour once a day; and on that immediately preceding the operation he should have a gentle laxative, as infusion of senna and tamarinds, or any other that will not

give gripes ; and, at least eight hours before it is performed, he ought to have a large injection of plain water, to wash out the fæces clean from the rectum. The penis is to be gently tied up for four hours before the operation, in order to distend the bladder considerably, so that there may be no danger from the introduction of the gorget. The under part of the scrotum is then to be clean shaved, as well as the perinæum and parts about the anus ; after which the patient is to be placed on a table of a proper height, *viz.* three feet, or a little more, and broad in proportion, that he may lie as much at ease as possible. He must then be secured as firmly as we can, taking care not to hurt him ; and, to do this, the best method will be to take two pieces of broad firm tape, about two yards long each, and double them, after which a noose is to be formed on each. One of the nooses is to be put upon each wrist, and drawn tight ; after which the patient is to be desired to take hold of each of his feet with his hands immediately on the outside of each ankle, making the fingers of his hands pass across the hollow of his feet. The two ends of each noose must next be tied, first round the small of each leg, and then round each hand, till the wrist, leg, and foot, are completely and firmly secured. The surgeon and assistant must make those ligatures, the one on the one side, and

and the other on the other; after which the surgeon is to introduce a staff grooved on the convex part, of a proper length, such as those represented plate 6. figs. 1. 2. 3. 4. open to the very extremity, so that the point of the gorget may pass from it smoothly and freely. The patient then, having been previously secured, his buttocks considerably elevated by means of several pillows, while one or two are only to be put under his head, must be brought immediately to the edge of the table, when an assistant, placed upon a chair on each side, lays hold of a knee with his right hand, and a foot with his left, opening his limbs gradually, and securing them firmly. Another assistant must secure his hands, and at times gives him a little wine, or other cordial drink. A fourth assistant must have in readiness the instruments necessary for the operation, with a basin of water heated for the purpose. The surgeon, having again felt the stone, so as to be assured that there is no mistake, must next pass the staff, either to the right or left groin, according to the hand with which he operates, so that the convex part which has the groove in it may be distinctly felt on the right or left side of the suture of the perinæum. This being done, a fifth assistant is to hold the staff steadily in the position just mentioned, with his right hand; and with his left he is completely to raise and support the scrotum.

scrotum. Every thing being thus adjusted, the surgeon is to feel for the groove of the staff, and to begin the operation by making an incision immediately below the symphysis of the os pubis, directly over the bulb of the urethra in the direction of the groove, on that side to which the staff points, continuing it somewhat obliquely downwards along the perinæum, half way between the anus and tuberosity of the ischium, until it comes nearly opposite to the point of the coccyx. This incision ought to divide the skin and cellular substance, and the size of it ought to be according to the age or stature of the patient. It requires considerable attention to make this first cut properly; for I am convinced that an error in this has been productive of almost every other fatal error in the operation. In making the incision, there are only two given points, *viz.* the symphysis of the pubes, and point of the coccyx. By dividing the skin and cellular substance freely between these two, it is evident that the surgeon will lay open distinctly to his view the bulb of the urethra, the transversales perinæi, &c. and at the same time make an opening sufficient for the extraction of the stone, if the size of it be not uncommonly large.

Having made his first incision, the surgeon next begins to divide the left transversalis perinæi immediately at its insertion into the bulb, by cutting it transversely; and, after this, he
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cuts a few fibres of the levator ani, and thus lays bare the whole of the membranous part of the urethra, without hurting the bulbous part of it, which certainly would be done, were we to follow the directions given by some authors to cut the erector penis and acceleratores urinæ. It is extremely obvious that these ought never to be divided, on account of the number of small blood-vessels with which they abound, and the danger there is of fistulous openings taking place afterwards; but if, in the course of the operation, any large artery should happen to be cut, the operator must instantly secure it by ligature before he proceeds farther, otherwise the patient, particularly if in an emaciated situation, might be greatly endangered.

The operator, having proceeded thus far, will now have a distinct view of the membranous part of the urethra, almost from the bulb to the neck of the bladder. He is now to search for the groove of the staff with the forefinger of his left hand, pressing it along from the bulb downwards to the neck of the bladder; then fixing it there, and the nail of his finger being upwards, if he has moved it in the manner directed, he turns the edge of the knife towards the groove, keeping the back of it upon his nail, and cuts the urethra, by pushing the knife into the groove, and gently raising it upwards along the membranous

braneous part, until he comes to the bulb. With a scalpel then he at one stroke divides the urethra from the neck of the bladder upwards to the bulb, without the least danger of wounding the rectum, or even the bulb itself, if he proceeds cautiously. If the surgeon keeps his hand and finger steady, he might complete the operation with the scalpel by turning it, and cutting laterally in the course of the groove of the staff, keeping the finger still pressed along with the scalpel; and in this way, there is not the least danger of wounding any other parts than such as it is absolutely necessary to divide, *viz.* the prostrate gland, and neck of the bladder. I am sorry, however, to say, that, even in the hands of such as are looked upon to be very expert surgeons, I have seen the lateral operation for the stone very ill performed; for which reason, I must request the young operator to use every precaution he can, as well for the security of the patient, as for his own reputation. That the prostrate gland then and neck of the bladder may be cut with perfect safety, and without any danger of wounding the rectum, an instrument, named a cutting gorget, has been invented, the use of which is now preferable to the scalpel. The most proper form of the gorget are represented plate 6. figs. 4. 5. 6. This instrument was first invented by Mr Hawkins of London, but the form

form was different from that represented in the plate, and liable to some very material objections. The cutting part of it was too much contracted, which prevented it from dividing the prostrate gland and neck of the bladder in the manner it ought to be. To remedy this, the breadth of the instrument was greatly enlarged in the back part, so that it was made there twice as large as the cutting part. This again was quite unnecessary; for the only use of the gorget is to cut the prostrate gland and neck of the bladder, after which it serves only as a conductor to the forceps for extracting the stone. Were we to use an instrument much wider in the cutting part than is usually done, we might indeed make the opening in the prostrate of sufficient magnitude; but, as the gorget commonly in use is insufficient for this purpose, an instrument called a *cutting director* has been invented by Mr Bell of Edinburgh, and which, in his opinion, has all the advantages of the gorget, without any of its inconveniences. It has been observed, however, that it does not answer the purpose of a director to the forceps so well as could be wished; the groove is by far too small, which is not the case with that represented in the plate, and to which, from long experience, I give the preference above all others. The surgeon, therefore, having proceeded in the operation as far as directed,

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the membranous part of the urethra being divided, and the finger kept in the place above mentioned, is now to lay aside the knife; and having directed the beak of the gorget along the nail of the finger, which serves as a director for the groove of the staff, the beak is to be introduced into it, taking care, that not only the assistant, but the surgeon himself, may feel it rub in the groove without any thing being interposed between them. This piece of attention is exceedingly necessary; for, where it has been neglected, I have seen the most fatal effects; such as the gorget passing into the cellular substance between the rectum and bladder, in consequence of which the forceps were passed in the same direction; and before the surgeon has discovered his mistake, the patient has been kept in torture for fifteen minutes or more; after which the staff has been again introduced into the bladder, the stone distinctly felt, the urethra again laid open, the gorget used, and this at last succeeded by a discharge of the contents of the bladder; after which the stone has been laid hold of by the forceps and extracted. Were the directions just now given to be observed, *viz.* that the beak of the gorget were certainly found to rub against the groove of the directory, this could never happen.

The surgeon is now to proceed in the operation, by raising himself from his chair, taking

the staff from the assistant, raising it from the groin to nearly a right angle with the patient's body, keeping it firm, and again, while it is in this situation, the surgeon himself must feel if the beak is in the groove. If this is the case, he gently elevates his hand with the gorget, and thus, gradually depressing the beak till he has entered it within the neck of the bladder; it is then to be pushed in the direction of the groove forward and upward, until the surgeon finds the beak pass off at its point. He ought now to stop; for, if he gives one push after this, which is but too frequently done, he must be in the greatest danger of running his gorget through the side of the bladder into the rectum, or forward into the cavity of the abdomen. The reasons of this are very plain; the gorget must already have passed distinctly into the body of the bladder, by which its contents will be instantly evacuated, and of course it will instantly contract itself; so that, in nine cases at least out of twelve, a second push must be productive of bad consequences, every one of which may be easily prevented by the method above described. It is almost needless to remark, that the beak of the gorget and groove must have been previously fitted for one another.

The gorget having fairly entered the bladder, which in general may be known by the imme-

mediate discharge of its contents, or at least as soon as the surgeon has withdrawn the staff, he is to introduce his finger along the gorget till he finds it in the cavity of the bladder, and very probably the stone at the same time. A pair of forceps, adapted to the age and size of the patient, are then to be introduced, (all the variety of kinds that can be necessary are represented plate 5. figs. 5. 6. 7.), and cautiously moved along the groove of the gorget, keeping the point of them at an acute angle with the hollow of the groove, till they are found to be fairly within the bladder; after which the gorget is to be removed exactly in the same direction in which it was introduced; and in this way only can it be withdrawn without injury to the patient, for by turning it in any other way it must do harm by wounding fresh parts.

Having now fairly introduced the forceps, and withdrawn the gorget, it must, on the smallest reflection, be evident, that the stone cannot be at any great distance. It cannot, for example, be above the brim of the pelvis; and the dimensions of this are easily ascertained; we may call that of a male four inches, or perhaps six every way. As the neck of the bladder is parallel to the rectum for a considerable space; and as, in the present position of the patient, the rectum is parallel to the table, it is plain that the stone
must

must also be in the same direction, and must be sought for accordingly. If, then, it lies at the neck of the bladder, and I know no where else that it can be; it cannot be, at the most, an inch and an half from the very outward edge of the wound, even in those patients who are very corpulent. Let us next suppose the larger diameter of the stone to be three and an half, or four inches, which is one of the largest that has ever been extracted. In this case, it is evident, that, by pushing the forceps seven inches beyond the external opening, as is often done, and raising the handles of them, their points must be exactly an inch and an half beyond the stone. By elevating the handles of them in this direction, the stone must always be nearer to the neck of the bladder by an inch at least, than that part of the forceps with which you search for and endeavour to lay hold of it. The forceps then, being put in this position, is opened, and kept open by the surgeon, having an handle in each hand. In this way he goes on groping, and opening and shutting them, probably for ten or fifteen minutes before he can find the stone at all; or if he happens to be more successful, and attempts to lay hold of it, he most commonly loses the hold, as having it only by one extremity, and that the farthest from him. Crooked forceps, and larger straight ones are then tried to as little purpose, until

til at last the stone is laid hold of, as it were, by accident, merely by the surgeon's bringing the forceps more into an horizontal position, and opening and shutting them upon it. In this bungling way the stone may sometimes be got out at once; but it very frequently happens that it is broken in pieces; which accident is entirely to be attributed to the surgeon having wrought so long before he could get a firm hold; and the moment he does so, by pressing too hard, for fear of losing it again, he commonly breaks it; and thus the poor patient is made to undergo five or six operations instead of one; the withdrawing the forceps and introducing them again, being, in my opinion, almost equal to an operation at any time.

The method just now described, however absurd it may appear, is almost invariably practised at present; but it is evident that the success of the operation depends entirely on laying hold of the stone quickly, and bringing it away at once, and that the danger is in proportion to the injury done to the patient. By recollecting what has been said concerning the dimensions of the pelvis, situation of the bladder, &c. we will easily see that the following is that mode of operating which ought to be adopted. Having introduced the forceps shut as close as their form will admit of, instead of raising their handles, you must depress them, so that the instrument may
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lie exactly parallel to the table ; push them then no farther into the bladder than till you meet with a little resistance, which will always be felt, though slightly, as the fundus and sides of the bladder are but weak and resist little. In this situation, with one blade of the forceps towards the arch of the pubes, and the other immediately above the stone, open them completely, (but never till you have distinctly felt it with the under blade), so as to make the one blade fill the upper, and the other the under side of the bladder. In this situation gently turn them, till you fill the pelvis laterally in the same manner, depressing the blades of them within the bladder, by keeping the handles exactly parallel to the table, or raising them a little ; then gently shut them upon the stone, which, in this way, you will never miss, though no bigger than a large land bean. If it be small, the stone will readily come away ; but, as this is not always the case, it is proper that the surgeon should be acquainted with every difficulty that may occur. When he finds then, that, upon laying hold of the stone, the handles of the forceps are very much expanded, he may then be certain, either that the stone is very large ; that it has two unequal diameters, and that he has hold of it by the largest, or that he has laid hold of it by a part of the forceps near the joint. This last inconvenience may

may easily be remedied, as in some measure the first may also be ; and, to do so, the finger must be gently introduced along the sides of the forceps, till you find the stone ; if the latter happens to be too near the joint, allow the instrument to open a very little, and, with your finger push the stone forward, still shutting and gently withdrawing them till you feel it right in the hollow of the instrument. If the stone happens to be caught by the longest diameter, you may easily feel by introducing your finger, and examining it laterally, as well as comparing the diameter held between the blades of the forceps with the lateral one. Suppose, for example, the stone to be oval, and that you lay hold of it by the longest diameter, which we shall call three inches, while the short one is no more than two ; or, if circular, the greatest diameter may be four inches, while the smallest is not above one. In either case, it is evident that great injury may be done to the neck of the bladder, by forcibly tearing away the stone in the position in which it happens to be laid hold of ; if the stone therefore happens to be oval, the forceps must be held gently together upon it ; and the surgeon, with his forefinger, is to push the under end of the stone from him, straight upwards, by which means he will be enabled to lay hold of it by the
smallest

smallest diameter. If it happens to be circular, the surgeon must press the under edge of it gently, but firmly, into the left-side; by which means the other will fall the contrary way; and thus he will now be able to lay hold of it by the least diameter; but in this case great care and attention is necessary. If the stone be three inches and an half, or more in diameter, there is but one possible way of extracting it. As the distance between the tuberosity of each ischium is no more than three inches and an half, it is evident, that, if the diameter of the stone exceeds that distance, it never can pass it; the surgeon must therefore turn the forceps, so that one blade may be on the one side, and the other on the other; and thus the greatest diameter of the stone will always be to the greatest diameter of the pelvis, and *vice versa*. The surgeon should grasp the stone with no greater firmness than is just sufficient to bring it along with him. He is to hold the forceps with both hands, pulling gently, but gradually, firmly, and slowly; moving the hands simply in the direction of the external wound. In a case of this kind, either a rotatory or lateral dilatation must be absurd, and could be dictated only by ignorance; but in truth I have often had the mortification to see patients suffer very much in this operation through the ignorance of the operator.

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By taking care to act in this slow, cautious, and gradual way, we may, with safety to the patient, extract stones of a very large size, but in all cases we must remember that the danger to which the patient is exposed arises not so much from the size of the stone, as from the injury which the bladder sustains during the operation ; and this might always be avoided, were the following simple rules to be observed. 1. A free and large opening through the skin and cellular substance. 2. The proper introduction of the gorget in such a manner as to allow the stone to be freely extracted without pushing the instrument too far, and thus wounding the bladder in the opposite part. 3. The right management of the forceps, by which the stone may be readily extracted without breaking it, or keeping the patient long in torture by missing it, or injuring him by bruising the soft parts against the bones in extracting a large stone. By attending to these rules, I have operated upon upwards of forty patients with the greatest success ; not one of them having ever been more than nine minutes under my hands, counting from the time that he was taken out of bed, till he was laid into it again. Excepting in one case where the stone was large, I never took more than five minutes ; and I am able to convince any reasonable person that I never
lost

lost a single patient who could have been saved by an operation. I never shut my forceps after introducing them into the bladder and opening them, without having a firm hold of the stone; always extracting it without breaking, or once missing my hold; only in that case mentioned among others, where I thrice slipped the hold of a very large stone, but, the fourth time, extracted it with ease.

When, by any accident, a stone happens to be broken, all the pieces are to be extracted by the forceps, making use of your finger as a director for them into the bladder, and being very careful to have your finger within it before you introduce them. From want of attention to this, I know that some surgeons are apt to push the forceps laterally between the bladder and pubes, as well as frequently betwixt the rectum and bladder. Having at length removed every large piece of stone, scoops of various kinds have been recommended to take out the smaller fragments and sand which may remain; but I believe it will always be found that the finger is the best scoop; and with this we may easily distinguish and remove the smallest grain. Particular care ought always to be taken to do so; for, if the least particle is left behind, unless it happen to be washed off with the urine, it will almost certainly prove a nucleus for a new stone; and thus the patient would derive lit-

the benefit from the operation he had undergone. The surgeon may assure himself that there are no pieces of stone remaining, by an injection of warm water thrown up, either by a bag and pipe, or by a syringe.

If the stone be smooth and well formed on the sides, it is very probable that there is one for every smooth side; but it commonly happens that there are no more when the stone is rough; though there are some few exceptions to this rule. At any rate, the surgeon needs no other instrument for searching the bladder than the finger. This, as it is the most simple instrument, is also the best, as there is no case in which the bladder is completely contracted that the operator may not search every part of it with his finger.

When the operation is entirely finished, it may sometimes, though I think but rarely, happen, that a considerable discharge of blood takes place, and continues for a length of time. This, however, may be stopped by introducing an oval canula well covered with caddice, and the latter dusted over with styptic powder, into the wound, so that the orifice may be completely filled; and thus, not only will the hæmorrhage be stopped, but the urine at the same time allowed to flow through the canula from the bladder. Sometimes indeed it may happen that

that the blood thus discharged may get into the bladder, where it will coagulate, and produce very dangerous consequences. This may be prevented by placing the patient upon his back, with the trunk raised almost into an upright situation, by which means it is evident that the blood will flow more readily out at the wound than into the bladder; but should it happen that blood has actually got in, we must instantly set about getting it out again as fast as possible. The patient being laid on his back, with his knees separated, the finger is to be introduced into the bladder, and every particle of the coagulated blood removed. This will be done more easily by the finger, than with any scoop or instrument that has been invented. In this way, a considerable number of years ago, where a surgeon, in performing the operation for the stone, unhappily divided the rectum above the sphincter, so that the fæces passed into the bladder, and were thus confined until they became very hard, the thin part being washed away. By introducing my finger into the bladder, and moving it round it, the bladder contracted, and forced away every particle; and then, by means of a crooked probe-pointed bistoury, passed through the opening between the bladder and rectum, I laid open the sphincter and completely. The fæces now passed off by the anus without entering the bladder,

bladder, and the patient recovered, though a fistulous opening remained, and still continues open at the verge of the anus.

If the patient has suffered little from the operation, and the stone has been easily extracted, no medicine of any kind will be necessary; but that every kind of irritation may be taken off, after having unloosed the patient, and dressed him with a piece of dry lint, laying him to bed in a posture proper for discharging the blood through the wound, give him an anodyne proportioned to his age and other circumstances. An adult ought never to have less than thirty drops of laudanum; nay, in some cases, fifty will be found an under dose. At any rate, even where the patient has sustained some considerable injury, he for the most part makes little or no complaint for the first four hours after the operation; but afterwards, in about six hours, he begins to complain of a severe pain in the under part of his belly; which, if not soon relieved by anodynes, both taken by the mouth, and given by way of injection, warm fomentations to the region of the bladder, &c. will induce very dangerous symptoms; especially if the under part of the belly is swelled and hard, with a continual increase of pain. In this situation, if the pulse also becomes quick and hard, he must immediately lose as much blood as he can bear; a large injection
of

of warm water and oil, or linseed-tea, ought to be thrown up every six or seven hours, and the under part of the belly fomented with warm flannel cloths, or bladders filled with warm water, as formerly mentioned; it will also be of great service to apply numbers of leeches to the region of the bladder; but, if no relief is had in forty-eight hours from the commencement of these symptoms, and the tension and hardness of the belly still continue to increase, the scene will soon be terminated by death. Where matters end favourably, the patient has little or no pain, and voids his water, almost from the first, through the urethra; the wound soon fills up, and is completely healed in two, three, or four weeks. In this, however, as in all other wounds, the length of time taken up in the cure depends very much on the constitution and health of the patient. Sometimes part of the fore will heal very kindly, while a small opening continues, at which the urine continues to flow until the sides at last becoming callous, it degenerates into a real fistula. The best way to prevent this, is by introducing the lint to a sufficient depth within the lips of the wound, until the bottom is covered with granulations of flesh; taking care, however, not to stuff it too much, either with lint or any thing else, which might produce inflammation in the
lips

lips of the wound, and other disagreeable symptoms. Not unfrequently the patient is troubled with an excoriation of the buttocks, owing to their being constantly wet with the urine; the best remedy for this is to wash the parts with cold water, which is much preferable to ardent spirits, or any of those irritating liquids recommended by some authors. In weak patients an incontinence of urine often takes place, which generally goes off as they recover strength; but, if it should not do so, the Peruvian bark, cold bath, and other tonics, are to be used; or, where no remedy has been found effectual, mechanical methods, such as compression of the penis, or applying receptacles to catch the urine, have been invented, to avoid the disagreeable effects of that weakness; but, as these apply to every kind of incontinence of urine, as well as that which ensues from the operation of lithotomy, we shall speak of them when treating particularly on that subject. It must not be forgot, however, that, where the patient is very weak, he must be supported with proper and nourishing diet along with his medicines, or he cannot be expected to recover.

Women are sometimes attacked by this disease, though less frequently than men, and when they are, the operation is much more easily performed upon them, by reason of their
urethra

urethra being much shorter and wider than in men. This is also to be accounted the principal reason why they are so seldom attacked by the stone, as any nucleus or small stone is more easily evacuated than in men; for in women the urethra is not only wider, as has already been observed, but situated in a more depending situation. When the operation, however, is to be performed on a female, it cannot be done from the perinæum as in men, on account of the contiguity of the urethra and vagina, and the situation of these parts with respect to one another; for, as the urethra and bladder lie immediately above the vagina, it would be impossible to make an opening into either of the former without wounding the latter. In operating on a female patient, therefore, the surgeon is to introduce a straight grooved directory directly into the bladder, and then, by means of a gorget with its beak running in the groove of the directory, instantly to lay open the whole of the urethra, and neck of the bladder. Having done this, the directory is to be removed, the forceps introduced, and the stone extracted as already directed.

These are all the useful directions that can be given for the operation of lithotomy. Fancied improvements have been made by several practitioners, but time and experience have shown all of them to be either useless or pernicious.

It

It has been recommended by some to break large stones in pieces; and forceps, furnished with teeth and screws, have been invented for the purpose; but, whoever considers the danger that there is of injuring the patient by these violent methods, as well as the difficulty of breaking in pieces an hard stone, must easily see the absurdity of such attempts. Where the stone is very large, which may generally be discovered by an experienced practitioner, the high operation is to be preferred; but in all other cases the latter one is eligible.

SECTION III.

OF STONES IN THE KIDNEYS, THE OPERATION OF NEPHROTOMY, AND STONES IN THE URETHRA.

THE same causes which produce stones in the bladder, sometimes produce them also in the kidneys; nor are the symptoms which attend them in these organs in the least more mild than in the bladder. These symptoms are violent pain in the region of the kidneys, extreme sickness and vomiting, bloody urine, or such as is mixed with purulent matter or mucus; and these sometimes go to such an height, that the
operation

operation of cutting into the kidney through the common integuments and muscles, has been proposed, with a view to extract the stone, as is done with calculi in the bladder. To this operation many objections have been made, but I shall content myself with a single one, *viz.* the absolute impossibility of performing it without destroying the patient, as the surgeon, before he gets at the kidney, must cut through two or three inches deep of muscles, and some large nerves which lie in the way, besides the danger of wounding the large blood-vessels, after which, he would be obstructed by the false ribs in such a manner, that in all probability he could not extract the stone, supposing it to exist. Sometimes, indeed, an inflammation, occasioned by a stone in the pelvis of the kidney, terminates in an external swelling and suppuration; in which case, an opening may be made, without any danger, as soon as a fluctuation is perceived, and through this opening the stone will probably be discharged along with the matter; or, if not, it may be searched for and extracted by a proper instrument. The opening is to be treated as that of other abscesses, and will sometimes heal kindly enough, though there is danger of its degenerating into a fistula, through which the urine, along with some pus, will continue to be discharged as long as the patient lives.

M m m

There

There have been instances of the pelvis of the kidney so completely filled with stones, that the use of these organs was entirely lost, and the patient has died of a lethargy; but most commonly they leave the kidney before they have attained to any great size, and pass through the ureters into the bladder. This passage is attended with exquisite pain, and suppression of urine, which terminate in that lethargic disposition, owing to the saline and acrid particles of the urine being reabsorbed by the blood, and injuring the brain, and which is soon followed by death. If they pass into the bladder, they sometimes form the nucleus of a larger stone there; though, for the most part, they are of such a size as to pass through the urethra. As this canal is very dilatable, stones of considerable magnitude will sometimes make their way through it, and that without much pain, if they happen to be smooth; but, where rough and angular, they frequently occasion much pain, as well as a suppression of urine, equally dangerous with those already mentioned, if suffered to continue. Whenever, therefore, a stone is certainly known to be impacted in the urethra, the shortest and best method is to cut it out, without attempting to remove, by a long course of internal remedies, those symptoms which may at once be taken off by a slight
 surgical

chirurgical operation; for, though this operation is more severe when the stone happens to be far back in the urethra than otherwise, yet it is never attended with the difficulty and danger of that for the stone. In this case, and indeed in all others, the surgeon must secure the stone in its place, and drawing the skin strait, must make an incision on the stone itself through the common integuments and urethra; after which, he may extract it with the fingers, or a pair of forceps. When very near the neck of the bladder, the finger must be introduced into the anus, in order to support the stone properly in its place, and to prevent it being pushed back into the bladder by the pressure of the knife upon it. If it happens to be farther forward in the urethra, it may be turned out with the point of a knife. If at the very extremity, it may sometimes be removed by a pair of small forceps, or by previously dilating the urethra; but, should these methods prove ineffectual, an incision must be made as already directed; and, to prevent any concretion of the sides, or contraction of the canal of the urethra, a silver tube, or hollow bougie, may be introduced, or a catheter of elastic gum, when the cure is nearly completed, in order to keep it of a proper size.

The only difficulty that occurs with regard to this operation, is when the stone happens to be
directly

directly behind the scrotum ; for then the urine is apt to flow through the incision of the urethra into the cellular substance of the scrotum in such quantities as to occasion very troublesome swellings there. In this case, therefore, it is proper, where it can be done, to push the stone either back towards the bladder, by means of a staff, or forward in the canal, with the finger ; but, should both these be found impracticable, we must begin an incision at the bottom of the scrotum, a little to one side of the septum, continuing it all the way up to the stone in the urethra, when an incision is to be made into the canal, and the stone extracted, as already directed. Thus the urine which escapes from the urethra will have a free passage ; but, during the time of operating, it will be necessary for an assistant to keep the testicle out of the way of the knife ; as, unless care be taken in this respect, it will run a great risk of being wounded. It is also necessary to pay some attention to the dressings of the sore after it begins to heal, that the granulations may rise up from the bottom ; for, if the integuments be allowed to heal, while a vacancy is left below, there will be a collection of pus, perhaps of urine, formed in it, and very troublesome sinuses may be the consequence. When fistulous openings indeed continue for any time, it is no uncommon thing for the urine to
produce

produce stony concretions in the cellular substance of the neighbouring parts. Some of these are small, and easily removed; but others are so large, that an operation is necessary for extracting them. The incision is here to be made all the length of the stone, after which it is to be taken out with the fingers, or the forceps.

Women are sometimes subject to the stoppage of calculi in the urethra, but more rarely than the men; for, by reason of the wideness of the urinary canal in them, the stones generally pass very easily with the urine. If they do not, they may be taken out by means of a crooked probe; or the urethra may be cut open at the extremity, as far as is necessary to admit the introduction of a pair of small forceps, which will extract them with ease.

SECTION IV.

The foregoing directions for performing the operation of Lithotomy, exemplified and confirmed by the histories of a number of Cases.

J. M. a male child of six years old, had been affected with frequent and sudden stoppages of his urine when flowing in a full stream, attended with considerable pain and pressure,

pressure, which made him cry violently. For the first two years, these fits were wont to come on at the interval of about three months, and continued about three weeks ; but, during the last twelve months, they had been much more frequent, as well as severe ; the urine being always of a deep red colour, and frequently voided only in drops. From the account given me of these symptoms, I concluded, as soon as I saw him, that his disease was a stone in the bladder ; and this was confirmed on sounding him, the stone being not only felt distinctly by the staff, but the sound of the stroke plainly heard by those who stood by. Having readily obtained the consent of the parents, and the boy being otherwise in good health, I proposed to perform the operation in a few days, but previously ordered him to be put into a warm bath each night, for three nights. He had likewise a gentle dose of physic the day before the operation was performed, and an injection of warm water next morning. As soon as this injection had done operating, the penis was gently tied up, so as only to compress the urethra, that the bladder might be made somewhat full ; the patient was then tied, and laid upon a table, the grooved staff introduced as directed, and the stone again felt. The operation was then conducted exactly according to the rules already given, the stone taken

ken away. The whole space of time, from his being laid on the table, to the extraction of the stone, being no more than three minutes and an half. He was laid to bed with his head and shoulders raised, had an anodyne draught with fifteen drops of laudanum; slept three hours, and took some boiled bread and water sweetened with sugar,

This operation was performed on the 9th of October. He slept well, without any pain or fulness in the belly; passed a great deal of water through the wound. In three days, however, most of it was voided by the natural way, and in two days more entirely so. On the 20th of the month he could retain his water six hours; and, in twenty-four days from the operation, was dismissed completely cured.

In the month of March 1784, I was called to M. M. a young girl about four years of age, who had been for some time much afflicted with pain and difficulty in making water, the symptoms being much the same as in the former case, *viz.* sudden stoppages while it ran in a full stream, attended with severe strainings. The stone was distinctly felt on sounding; and she was prepared for the operation, as in the former case, by a gentle laxative, after which she had an anodyne draught with twelve drops of
laudanum,

laudanum, that, by taking off the irritation as much as possible, she might be able to retain her urine in the morning.

March 9th, The operation was performed, after having previously secured the patient in the manner already directed; a straight staff was then introduced into the urethra, the stone distinctly felt, and the gorget slid along its groove into the bladder. The staff being withdrawn, a small pair of forceps was then introduced, and the gorget removed in the same direction in which it was introduced; the stone was laid hold of and extracted, the wound covered with a piece of caddice, and the patient laid in bed; the whole space of time, from her being taken out of bed to her being put into it again, amounting to no more than four minutes and an half. An anodyne draught was immediately given as the former evening, and repeated at night; and she rested better than for several months before, without thirst, pain, or any other unfavourable symptom. In three days she was able to retain her urine for six hours, when lying a-bed, but only two when sitting on a person's lap; the cure went on without the smallest interruption; and she is now, nine years from the performance of the operation, in perfect health.

J. A.

J. A. a boy of seven years of age, had
for five years been afflicted with the symp- III.
toms of the stone mentioned in the former
cases; besides which, he was observed, during
the fits, to grasp his penis very strongly in his
hand; and when laid along his mother's knee,
while in a severe fit, with his breech a little rais-
ed, he would void his urine in a full stream,
and continue to do so till all was passed.

June 4th 1784, I sounded him in presence of
several gentlemen, who were all convinced, by
the stroke and feel of the staff, that his com-
plaints originated from a stone; his parents con-
sented to the operation; and as the boy, notwith-
standing his disease, appeared rather of a full
habit, I took from him four ounces of blood,
and ordered him a pretty brisk purge of com-
pound powder of jalap; besides which, I put
him into the warm bath for twenty minutes, and
gave him an injection. The penis was tied up
four hours before the operation.

In this patient the handle of the staff was
turned towards the right groin, and the grooved
part felt distinctly on the left side of the rapha;
a free incision was made with the scalpel through
the skin and cellular substance, the whole length
of the perinæum, by which the bulb of the ure-
thra and musculi transversales perinæi were
distinctly brought into view, as well as the other

N n n muscles

muscles that cover the bulb. A second cut was made, beginning immediately below the bulb, and dividing the left tranversalis muscle; the membranous part of the urethra was completely laid bare from the neck to the bulb; after which the nail of the left forefinger was placed in the groove at the neck of the bladder; the back of the scalpel turned towards the rectum, and the membranous part of the urethra divided at one stroke of the knife from the neck of the bladder to the bulb. The groove being now completely bare, the gorget was introduced into it; and taking hold of the handle of the staff in my left hand, and rising from my seat, after being assured that the gorget was in the groove, I entered it cautiously, and with great ease, according to the directions already given. Removing then the sound, and feeling with my finger that I was in the bladder, I introduced a pair of forceps and extracted the stone, finishing the whole exactly in five minutes, with the loss of very little blood to the patient.

The boy being put to bed, and having got an anodyne draught, slept well through the night, and passed a good deal of water in the natural way, so that by the next morning he had scarce any complaint. Next day, however, he began to complain of pain in his lower belly, about the pubes, where there was some degree of tension.

Eight

Eight leeches were applied in the forenoon, and the discharge of blood promoted by the application of cloths dipped in warm water; but as, notwithstanding this, the pulse still continued full, and the pain and tension were not diminished, twelve more were applied in the afternoon, by which means a pretty free discharge of blood was obtained, with great relief of the pain. His pulse had now fallen from ninety-six to eighty-six; but as his skin was still hot, and the patient thirsty, he had two spoonfuls of the common saline julap every hour, with an injection of six ounces of linseed tea, with twenty drops of laudanum. Next day the pain was almost entirely gone, and the feverish symptoms greatly abated; his urine continued to come away by the wound. He was ordered an injection of eight ounces of linseed tea, without an opiate, and his julap to be continued every two hours.

From this day the unfavourable symptoms ceased to appear; he very soon began to void his urine in the natural way; and in three weeks from the time of operation, the wound was completely healed.

A. T. aged twenty-four, had for ten years been affected with pain and stoppage of his water, attended with great pressure; the pain about the point of the glans and penis being
IV.
very

very excruciating. When I saw him, he had a constant weight and fulness about the anus, which was much increased when these severe fits of pain and pressure attacked him; and so severe was the disease, that for a week he would not be able to retain his water for fifteen minutes. During all this time his skin was hot, his tongue was dry, attended with thirst, and high coloured urine; this last being frequently high coloured and mixed with blood. I first saw him on the 24th of August 1785; and, on sounding him, felt the stone distinctly; after which he consented to submit to the operation. Being young and healthy, I bled him pretty freely, and next day gave him a dose of six drachms of castor oil, and two of compound tincture of fenna, which operated well, and was repeated three days after, he being kept cool and low during the interval.

September 2d, Early in the morning he had an injection, which operated well, the penis was tied up for several hours, and at one o'clock the operation was performed, and a large stone extracted in four minutes from the time he was first taken out of bed. It was thus easily got out, by my happening to lay hold of it in the most favourable manner possible; but, after the extraction, it was found necessary to secure an artery which had been divided, and bled considerably,

ably, a clot of at least a pound and an half of blood being found on the ground. The patient being put to bed, had a draught with thirty drops of laudanum given him immediately; and, as this did not procure him any rest, he had another with twenty-five drops at bed time. This procured a good night's sleep; but next morning he complained of thirst, headach, and other feverish symptoms, for which he had two ounces of the saline julap every two hours. Thus the feverish symptoms were removed, and no other medicine was found necessary throughout the cure than a common injection. His water continued to flow partly by the wound till the 12th, when it all passed the natural way. By the 1st of October he was completely cured, and was so far from being intimidated by what he had suffered during the operation, that he declared the whole of it was not to be compared with one of the slightest fits of the disease; and that, were he to be attacked again, he would not bear a second fit. It is now, however, seven years since the operation was performed, and he has never had the smallest complaint. The stone taken from this patient weighed six ounces.

J. M. a female child of four years of age, V.
 had calculous complaints from the time she
 was weaned, and had increased to such a degree
 for

for some time before I saw her, that she was entirely deprived of rest. Having no other instrument at hand but a large probe, I made use of it as a sound, and distinctly felt a stone. The operation was performed on the 26th of April 1786, and a stone of great magnitude extracted, being very considerably larger than a pigeon's egg. An anodyne was given immediately after the operation, and three days after that she had an injection; besides which, no other medicine was found necessary during the whole cure. Ever since that time, however, she retains her urine with difficulty when in an erect posture; though within these last twelve months this complaint has also diminished very much, by the use of the cold bathing at home, and in the sea.

J. H. a man of fifty-six years of age, had VI.
laboured under evident symptoms of stone
for twelve years. During this space he had been
several times sounded by different practitioners,
all of whom distinctly felt a stone. I saw him
on the 6th of November 1787, when he had
been for nearly two weeks confined to bed.
With some difficulty I prevailed upon him to
submit to the operation, after having endeavour-
ed as much as possible to mitigate his sufferings
by opiates and injections. The operation was
performed on the 10th of the month; but, on
my

my endeavouring to pass the gorget into the bladder, I found that it could not be done as far as I wished, on account of the resistance it met with from the stones in its way. On this I withdrew the staff, and introducing my finger along the gorget, found that the bladder was completely cut, though the instrument could not pass above half an inch into it. With the forceps I then cautiously laid hold of a stone, which yielded to the grasp of the instrument, though I had the good fortune to bring it away whole. On dropping it into Dr Grant's hand, who stood by, it fell to pieces, and I instantly began to search for another. The operation lasted seven minutes from the time of making the first cut in the skin, till the last stone was extracted; and during this time I took out five stones, each of the size of a small hen's egg, and weighing in all nine ounces and five drachms.

After this operation, an anodyne draught with forty drops of laudanum was instantly exhibited; he had a good night's rest, and continued to recover, though slowly, by reason of his emaciated and feeble state, without any other medicine, excepting occasionally an injection. For the first three weeks all his water passed by the wound; but from that time it gradually diminished, and began to pass the natural way, the wound being completely healed in six weeks from

from the time of the operation. For five years past he has enjoyed good health, and is now able to gain his bread as a muslin weaver.

R. A. a young man of eighteen, was for VII. five years afflicted with sudden stoppage in his water, when making it in a full stream, attended with severe pain about the anus, and point of the penis; the water being often very high coloured, particularly when the pain was violent and long continued; he would have a great desire to pass his water, without being able to do it otherwise than by spoonfuls, with great agony; and this would continue for several days together. I first saw him in the beginning of March 1788, and told his friends that his complaint originated from a stone in the bladder. Next day I sounded him, and felt the stone very plainly; and, on the tenth of the month performed the operation according to the rules above laid down, and extracted the stone in three minutes and an half from the time of making the first incision. An artery being wounded, he lost a considerable quantity of blood, but the hæmorrhage was soon stopped, by taking up the vessel. Having given an anodyne, he had a good night's rest, and passed his water freely by the wound, at first high-coloured, and apparently mixed with blood, but afterwards free from

from it. As he was affected by thirst and some other symptoms of fever, he was ordered barley-water with a little lemon juice for common drink, and two table-spoonfuls every two hours of a saline julap, made with one ounce and an half of spiritus mindereri to six ounces of water, and half an ounce of fyrup. Next day, as he was attacked by more unfavourable symptoms, as pain about the bladder, and tension about the pubes, with a sharp pulse at ninety-six, he was let blood to ten ounces, with orders to foment the belly with cloths wrung out of warm water, and to apply twelve leeches to the region of the bladder immediately above the pubes, in case the symptoms were not relieved. Thus the pain and tension were much abated; but, as the pulse continued rather full and sharp, the leeches were again applied, and a large glyster of warm water was given; the julap was continued, and a tea-cupful of Arabic emulsion, with a drachm of nitre to two pounds of the fluid, was given every two or three hours. By these medicines, the pain, tension, and other inflammatory symptoms greatly decreased; but, as the urine still continued high-coloured, and the thirst but little diminished, the injection was repeated, the emulsion continued, and at bedtime he had a draught, with twenty-five drops of laudanum. By continuance of these remedies, his complaints gradually abated. On the

eleventh day from the operation, all his water passed in the natural way, and, by the 12th of April, the wound was completely healed. He was now free from every complaint, excepting that, after walking for some time, he found his water, after being retained two hours, to come away insensibly. For this I prescribed half a drachm of bark, and five grains of alum, rubbed together, to be taken three or four times a-day. This had the desired effect, and, in the month of June following, I had the satisfaction to hear that he was perfectly recovered in every respect, and could retain his water as well as before the operation was performed.

R. M. a boy of five years of age, had been afflicted with pain and difficulty in making his water, almost from his birth, the stoppages being frequently attended with such pressure as to occasion a slight prolapsus ani. When I first saw him, in January 1789, he was very much emaciated from the severity of his disease, which evidently originated from a stone in the bladder. On sounding him, it was distinctly felt, and, in four days after, having prepared him, as already mentioned in the cases above related, I performed the operation, and in five minutes extracted a stone of half an ounce in weight, and bulky in proportion to its solidity. No medicine, not
even

even an injection, was given him throughout the cure; only, immediately after the operation, he had an anodyne draught, with twelve drops of laudanum. On the third day he voided all his water through the urethra, and, in fourteen days from the operation was completely whole.

A. S. a man of thirty years of age, had been affected with calculous complaints for more than eight years. At first he had only at times a pain at the point of the glans immediately after voiding his urine, especially, upon using violent exercise or hard labour of any kind. By degrees his complaint increased, attended with a violent desire of making water, which sometimes he could do only in drops. On seeing him in May 1789, I told him that his complaint originated from a stone; which, upon sounding him, was distinctly felt. He had then been so ill for ten days, that he could not retain his urine longer than ten or fifteen minutes at a time, and then passed it with the greatest agony, insomuch, that it brought on a very troublesome tenesmus, or desire of going to stool, when making water. Finding him in this situation, and that he was otherwise healthy, I took from him ten ounces of blood, and next morning purged him gently with an electuary made of chrystals of Tartar and syrup; a tea-spoonful

spoonful to be taken every hour and an half until it operated. At bed-time he had a small injection, with fifty drops of laudanum. In the morning he used the warm bath, sitting down in it so that the water covered him entirely from the umbilicus to the middle of the thighs, his legs and feet being quite without the tub; thus he continued covered up with blankets for half an hour, and, when the water began to cool, four pounds of it were taken away, and supplied by six of boiling water. Thus he was bathed every night and morning for six days, having also an injection every night, with a laxative every other morning. Thus the violence of the symptoms began gradually to abate, inso-much that, before the operation was performed, he was able to retain his water for more than two hours. Two days before it was performed, all the medicines were omitted, without any return of his bad symptoms; only, that morning, he had a large injection, after the operation of which, the penis was tied up for three hours, and the stone, weighing four ounces, extracted in three minutes from making the first incision. Though no artery, that could be taken up, was wounded in this operation, he lost a considerable quantity of blood. On being put to bed, he had a draught, with thirty-five drops of laudanum. That night he rested well; and throughout the whole

whole cure had occasion for no medicines, excepting a single injection, and anodyne draught. His water smarted the wound severely while it passed by it; but, by the sixth of June, he began to pass most of it by the urethra, and, on the twenty-sixth of the month, was dismissed entirely cured.

September 3d 1789, I visited H. W. a X.
young man of eighteen, who, for several years, had laboured under very evident symptoms of stone. He complained of an almost constant desire to make water, great pain about the anus striking forward to the glans penis, and a strong desire to go to stool every time he attempted to make water; his urine also depositing a considerable quantity of mucous sediment.

This patient had been already sounded by a surgeon in the country, who plainly felt the stone, so that I had no room to doubt; but, as the symptoms were then very urgent, I endeavoured to relieve them, previous to the operation, as in the former case. By the use of similar medicines, he was considerably relieved, so that he could retain his water for upwards of two hours. By causing him lie on his side in bed, with a couple of pillows under his breech, he was also enabled to pass his urine for three days

days without any pain or stoppage whatever. Finding now that his pulse was regular, his appetite good, and every symptom of irritation and inflammation abated, I performed the operation on the nineteenth, after having prepared him as usual. In four minutes from making the first incision, the stone was extracted with the loss of very little blood, or other injury. As the patient had suffered so little, I did not give him any opiate. He was put to bed at one o'clock, and at six, when I called upon him, he had slept an hour and an half, and was entirely free from pain and uneasiness. At ten at night I found him in the same way; he had passed a considerable quantity of urine by the wound; a draught with twenty-five drops of laudanum was prepared, but he was not to have it unless restless. He slept well, and three hours at a time; the cure went on without any bad accident, and, by the tenth of October, was quite completed,

D. W. a boy of eight years of age, was
 admitted a patient in the Royal Infirmary XI.
 on the second of February 1787. He complained, at that time, of an almost constant desire to make water, with great pain at the point of the penis, which he for the most part grasped firmly with his hand; and he had besides frequent
 tenesmus,

tenesmus, and a small prolapsus ani. These complaints had been of three years standing; slight at first, but gradually augmented. The desire to void urine, for the last six weeks, had returned every half hour, throughout the night, as well as the day; his appetite was also impaired, his belly loose, and his urine high-coloured.

On the third day after his admission I sounded him, in presence of several of my brethren, none of whom could feel the stone, though I was very sure that there was one. After this he was put into a warm bath, and had an opiate every night, for three nights, till the injury done him in sounding was relieved. Another consultation was held on the 8th, but with the same event as before. I felt the stone at the point of the staff, and always in the same place; but none of the other gentlemen could do so. The boy suffered much, as is always the case, when a number found upon an uncertainty; so he was put into the warm bath, and had an opiate for three nights more. As he had come from a considerable distance in the country, from Angus-shire, I wished that another consultation should be held. The members were desired particularly to attend, and I again sounded him, and felt the stone as before; but no other person could distinguish it, even after long and repeated trials; and the boy's father would not afterwards allow him to be sounded any more. After having
taken

taken him out of the Hospital, I propos'd to take a room for him and perform the operation privately ; but as he had already suffered so much, and his father could not stay longer in town, he took him with him again into the country, promising to return again with him in May, if his complaints continued. He did not, however, return at the time appointed ; and, soon after, I received a letter from his father, of which the following is an extract :—" David William came to the Infirmary on the 2d of February 1787, and staid there fourteen days. I remember distinctly, that, upon all the three different trials, the surgeons, yourself excepted, agreed unanimously, that there was no stone. Circumstances fell out, that prevented my coming back to you as was agreed upon ; and as the boy still continued very ill, I consented to allow Mr Stewart in Dundee, and Mr Goodlett in Kirriemuir, surgeons, to try if they felt a stone, which they did ; and I likewise consented to allow them to cut him, which they also did. The boy died soon after. I have sent the stone in a small box directed for you, as it may be of use to you. I am," &c.

In this case the patient could seldom retain his water above fifteen minutes, and never above half an hour ; so that every time he was found-
ed the stone was found directly at the neck of
the

the bladder, and was pushed by the sound before it. Had the bladder been distended with water, the staff would have passed over the stone, and it would have still been found near the neck, and under the staff.

November 3d 1789, I visited J. B. a XII. boy of twelve years of age, who complained of great pain in making water, seated near the anus, and striking forward to the point of the penis, with severe tenesmus. His urine was voided in drops; and for these last fourteen days he could not retain it above half an hour. His water was high coloured, pulse seventy-eight, and his appetite impaired. Next day I sounded him and felt the stone; but, as the symptoms were very urgent, I endeavoured to allay them in some measure before the operation. This was done in fourteen days by bleeding, the warm bath, an anodyne injection every night with forty drops of laudanum, and now and then a gentle laxative. On the 17th I performed the operation; and, in three minutes and an half from the first incision, took away a stone an ounce and a quarter in weight. He lost so little blood, and suffered so little otherwise from the operation, that I did not give him any draught. In three days he voided about one half of his urine the natural way; and, in six more, the

whole of it. By the 6th of December the cure was completed.

L. S. a boy of about eight years of age, XIII.
 had for four years been affected with
 very severe calculous complaints, such as pain in
 making water, which could be done only by
 drops at times, tenesmus, prolapsus ani, high-
 coloured urine, &c. For ten days before I saw
 him his appetite had been much impaired, and
 his complaints had greatly increased. Indeed
 his parents informed me that every succeeding
 attack had been more severe than the former.
 Having assured myself by sounding him that
 there was a stone, I mitigated the severity of
 the symptoms by the remedies mentioned in the
 former cases; and such was the good effect of
 this preparation, that he suffered very little from
 the operation, which was finished in five minutes.
 He got no anodyne after it, nor any medicine
 throughout the cure, excepting a single injection.
 In eight days he passed almost all his
 water in the natural way; and in about three
 weeks the wound was completely healed.

J. R. a man of seventy-six years of age XIV.
 sent for me to relieve him of what he
 supposed to be a strangury, and which had made
 such a severe attack, that he had voided no wa-
 ter,

ter, except in drops, for two days. Finding the bladder much distended, I introduced a catheter in the same manner as if I had been to search for a stone, and thus drew off almost four pounds of high coloured urine, from which he had instant relief. The ease he now felt, however, was but of short duration. Next day I was again sent for, and drew off three pounds more; and for several days running there was a necessity for using this instrument twice a day. Finding, however, that it was not in my power, on account of the distance, to attend with such regularity as was necessary, I introduced an hollow catheter made of elastic gum, leaving it in the bladder; so that, by means of it, he could void his urine at pleasure. In three days I withdrew it, and found by the appearance of that part which had been in the bladder, that it had been rubbed against a rough and hard substance, for it was full of scratches and small furrows. I did not introduce this instrument again, being desirous to know if he could now make his water without it; but this being found impracticable, I had again recourse to the common catheter. With this I now searched the bladder carefully, and found a stone so plain, that the patient himself could distinctly hear the hollow tube strike upon it. On his inquiry what it was, I told him; but did not recommend the operation on account of his great debility and want of appetite, so
that

that he could not taste animal food, and at the same time I had for some days observed his urine depositing a disagreeable smelled sediment. From this time he was much distressed with a constant desire to make water, attended with great pain; and being informed that all his complaints originated from the stone, he asked if cutting would give him relief. I told him, that, in his present situation, he could expect but little relief from the operation, on account of his weakness. Next morning, however, he sent for me after a very restless night, and when I had taken off his water, he asked if there was no chance of his recovery after the operation. I could not say positively that he would not recover, but I told him that the chances were an hundred to one against him. "Would I be free from pain, says he, while I lived?" I told him I believed so. "Then, says he, I have made up my mind upon it: You are to cut me immediately at my own desire; death to me being more desirable than a life of such pain as I have had for six weeks." His family, who were present, insisted also upon his being relieved; on which I made every thing ready for the operation, and next day at twelve o'clock, took away from him a very large and rough surfaced stone. The operation lasted only five minutes, counting from the time the patient was taken out of bed, until he was laid into it again. He lost very little
blood

blood, and suffered no injury otherwise that could possibly affect him, and next day he thanked me for the great relief I had given him. For some days after he seemed to recover ; but after this he gradually declined, though without making the least complaint of pain or any thing but want of appetite, and the increasing weakness consequent upon his inability to take any food. He died of mere debility on the eighteenth day after the operation.

In January 1790, W. D. a lad of fifteen, servant to a gentleman in Edinburgh, was put under my care in the hospital. He had an almost constant desire to make water, which he could do only in small quantities, or by drops ; he had also a tenesmus, most violent pains, shooting along the penis to the glans, and symptoms of fever. The only momentary relief he had from his pain, was to squeeze the glans penis violently and constantly in his hand. As every symptom plainly indicated a stone in the bladder, I called a consultation to sound him ; but the first time it was attempted he cried so pitifully, and struggled so much, that I thought proper to desist. Upon enquiring why he cried so, he told me he had been almost killed by sounding in his master's before he came here. Having put him into the warm bath, and given him an opiate, I called another consultation at
which

which his master was to be present by agreement. I then founded him in presence of his master, and before many of my brethren, but none except Dr James Hay and myself could feel the stone distinctly. Some days afterwards another consultation was called, and trial made in a full consultation, but with the same want of success as before. Some days after this I was to cut another boy for the stone, and proposed to have cut this one also at the same time, if any other person but the Doctor and myself could find the stone. But, though I still felt it plainly, none of my brethren present could yet feel it. I was obliged again to send him away, though fully convinced in my own mind that he had a stone, and that it was as large as a pigeon's egg. But still I thought it cruel, considering the dreadful agony in which he sometimes was, not to do every thing in my power to relieve him; and, as one of the most eminent practitioners in this way had never been present at any of the consultations, I wrote to him privately, begging that he would call any time when convenient at the hospital in order to see this unfortunate patient. He came accordingly, and I again founded the boy, and felt the stone, though neither that gentleman, nor any other surgeon that was present with us could do so. I repeatedly took the staff in their presence, and every time struck it with the point distinctly, nay, the boy himself told them

them that I did so. On being asked how he knew that I struck it; he said, “that nobody but Doctor James Hay and myself had ever done so; I felt you strike something like a bone in a piece of flesh, but none of the rest ever touched it.” The gentlemen observed that this was very fallacious, to which I agreed, and then they raised him to his feet, but with no better success than before. Seeing, therefore, it was impossible for me to be of any service to him where he was, since none of my brethren could distinctly feel it, I dismissed him, with a view of taking a room for him in town, and cutting him privately; but, in a day or two, I understood from his master, that, as the poor boy had suffered so much, first and last, he had sent him to the country for some time to recover his health; and, when he should be a little better, he would let me know, that the operation might be performed. In about eight days after his removal to the country, he died; and I went, at his master’s desire, along with Doctor James Hamilton, physician, and Mr James Ruffel, surgeon, to open the body. The bladder was found quite empty of water, but contained a stone nearly of the size I had conjectured. I took out the bladder carefully with the stone in it, and brought it to the Infirmary, where almost all who had ever sounded him, happened to have met, and saw the event of the dissection.

The

The bladder was blown up in their presence, and I then cut it open, and took out the stone ; which, as well as the bladder, is still in my possession. It weighs two drachms and one scruple. The inside of the bladder was much inflamed ; and, in several parts, small suppurations appeared to have taken place upon its surface. All the intestines were inflamed, and some small ulceration had taken place on their surface. The patient appeared to me to have died of cytitis conjoined with enteritis, probably from his living in the country in a low damp house, after having suffered so much injury from the many searchings, as well as from the disease. The inflammation of the bladder had probably been communicated to the intestinal canal by sympathy.

The reason of the great difficulty there was in feeling this stone, as well as the other two narrated, appears to me to have been, that the bladder was always empty at the time of sounding. For, as, for three months before, the boy could not retain his water for more than one hour at a time ; and, for more than a fortnight before his admission, never longer than fifteen minutes, or half an hour at most ; it is plain, that the bladder could never be distended. The stone then, instead of being under the sound when introduced, filled the whole of the bladder, so that when the sound was introduced, it could only

be felt by the point of the staff; and, upon attempting to feel it very distinctly in this way, it was pushed immediately against the fundus. In the common way of sounding, therefore, it never could be felt. I assured myself that this was the case, because, unless I depressed the handle of the staff, and raised the point of it softly, but striking smartly towards the fundus of the bladder, I never could touch it; and this must always happen, when there is no water in the bladder at the time of sounding.

L. S. a boy of eight years of age, was cut on the day above mentioned, when I intended also to have cut the former patient. The stone was extracted in the usual time, within the five minutes. He lost very little blood, and suffered little otherwise; but, as he was weakly, and of an irritable habit, I gave him an anodyne immediately after being put to bed. He had another next night, and an injection on the third day. The cure went on without the least bad symptom, and was completed in eighteen days. XVI.

J. C. twenty years of age, had for many years been afflicted with symptoms of the stone; and, for these last three months, had been in great distress; but, though XVII.

I had sounded him several times, I never could be very sure that I felt the stone. His urine was clear, but though clear, I thought it deposited, upon standing, a kind of matter; and, at last, after many trials, at long intervals, I thought I felt the stone distinctly, but very small. At this time, however, he was very much weakened and emaciated, on which account I was averse to the performance of the operation; but, at his earnest entreaty, to give him the only possible chance of recovery, I at last consented, and took away from him a small stone about the size of a large land bean, at the same time, that there was discharged, along with the blood and water, a quantity of sand, in bulk equal to the stone, inclosed in a kind of film. He suffered very little from the operation, had an anodyne draught, and for four days every thing seemed to go on well. On the fifth he began to complain of a pain along the whole length of his penis, particularly severe at the point; his water was voided freely through the wound, but none at all in the natural way. The pain continued without any intermission, so that I thought proper cautiously to introduce a sound through the urethra, to see if there was any clotted blood or other matter which might cause an obstruction, but found none; neither was any thing found in the bladder

der upon introducing my finger gently into it through the wound. He was ordered a nourishing diet, with some wine, and had an anodyne night and morning, but nothing was of any avail. The pain continued without any remission, and large quantities of fabulous matter was daily discharged through the wound. Injections, anodynes, and every other thing I could think of, were tried with a view to relieve him, but to no purpose; the pain and discharge by the wound continued; nor did he ever pass any water by the urethra; his strength daily decreased, and in twelve weeks from the operation he died.

I opened the body in presence of the friends of the patient, and several gentlemen of my own profession. The wound in the bladder was found to be completely healed, excepting only a small hole towards the neck, of the size of a goose quill. Taking the intestines then entirely out, we endeavoured to trace the ureters from their entrance into the bladder upwards to the kidney. At the place where the left ureter passes over the brim of the pelvis, we found it very much enlarged, and completely filled with sand and matter. The kidney was at least four times its natural size, and, upon attempting to take it out of the body, it burst, and discharged nearly two pounds of purulent matter; the whole of its substance
appearing

appearing to be destroyed, and nothing retaining the matter but the peritonæum. On opening the bladder, the whole of its internal surface was found covered with a similar kind of matter, and with particles of fine sand.

In January 1790, a boy of the name XVIII, of John M'Cleod, six years of age, was admitted into the Hospital, who for upwards of four years had been affected with symptoms of stone, that for the last twelve months had greatly increased. At the time I saw him, he had an inclination to make water every hour, attended with severe pain, tenesmus, and pressure, so as to produce a prolapsus ani; and, along with these symptoms, he often voided his urine in drops, with exquisite pain. I founded him in presence of a large consultation of surgeons, and felt the stone distinctly, though none of the rest did. They owned indeed that they felt a rub, but could not say that it was a stone. He was then put into a warm bath, which was ordered to be repeated every night; had an anodyne glyster, with twenty drops of laudanum evening and morning; for ordinary drink he had an Arabic emulsion, with double the quantity of gum, and two scruples of nitre to every two pounds. Another consultation was held soon after, but with the same event

vent as before. I only was able to find the stone distinctly; but, though I did so, and even made the staff rub hard against it, by passing it upwards on the left-side between the bladder and stone, and then making the point of it turn towards the right-side; yet I found it impossible to convince any of my brethren that there was any stone there. Being still willing to try what could be done, I kept the boy some days longer in the House, and called a third consultation, at which no fewer than fourteen persons were present. He was laid on the table, and again sounded. I felt the stone distinctly as before, but not one of the rest was able to do so; so that that no operation could be resolved upon. I therefore asked each of the gentlemen, individually, "Would you operate in this case from what you feel?" To this all of them answered, "No." Finding matters thus, I dismissed him in a day or two, and attended him in his mother's house, till the effects of so many soundings should be removed; and, in the month of June thereafter, performed the operation in presence of Doctor Grant, Mr Shiells, and a number of young gentlemen that had been present in the Hospital when the boy was sounded. I took away a stone from him in three minutes and an half; and so little did he suffer during the operation, that he never cried, nor even fetched a
deep

deep sigh throughout the whole of it. No medicine was given him during the cure ; and, in fourteen days, he was dismissed perfectly whole.

A. C. a boy of seven years of age, XIX.
 was admitted into the Hospital in October 1783, for calculous complaints ; and, on sounding him, the stone was distinctly felt, and the sound of the staff upon it heard. Having prepared him, as mentioned in some former cases I operated upon him in the ordinary way, and extracted the stone within the usual time, five minutes. He suffered very little during the operation, and was put to bed, after having an opiate, with fifteen drops of laudanum, which was repeated at night. He continued well for two days, but, on the morning of the seventh of the month, the third day from the operation, he was seized with pain and tension in the abdomen, about the pubes, and lower belly, attended with sickness, nausea, and vomiting. Early in the morning I ordered him to be well fomented, and called a consultation. The surgeons attended at twelve o'clock, and found him afflicted with constant vomiting, hiccup, quick pulse, and thirst ; with great pain and tension in the lower belly. I was comforted by my brethren with the assurances that he had suffered nothing from the operation, and that every thing had been done since the
 the

the commencement of his violent symptoms that could rationally have been done ; however, that my patient would certainly die. I was unwilling to put implicit confidence in this dreadful prognostic ; and therefore began to revolve in my mind what could be the occasion of these extraordinary symptoms. Being persuaded that inflammation had taken place, and that it was greatly aggravated by the vomiting and hiccup, I saw plainly that there were now two indications of cure ; the one to diminish the inflammation, and the other to prevent irritation. The former was accomplished by the application of leeches and fomentations ; and the latter by injections composed of four ounces of well made beef-tea, with twenty drops of laudanum ; one to be given every fourth hour. After the third injection the vomiting and hiccup ceased ; the pulse in 24 hours fell from 140 to 118 ; and, by a repetition of the leeches and other remedies, all the symptoms were greatly relieved. Finding the pulse now reduced to 110, I gave him a dose of ten grains compound powder of jalap very finely rubbed ; repeating the dose every two hours until it should operate ; which it did twice, after the third dose, with great relief. The injections were now continued every twelve hours ; the sickness, hiccup, and vomiting almost entirely gone, yet a considerable degree

gree of fulness remained above the pubes. This continued gradually to increase, and, in about ten days became prominent and a little inflamed, with evident marks of suppuration. By the application of poultices, it broke in three days, and a considerable quantity of matter was discharged. Two days after this the contents of the bladder were discharged through this orifice; the wound gradually healing up, and, in four weeks, being completely whole. In the course of eight weeks the orifice was quite closed up, and the whole of his water discharged by the urethra. Thus he continued apparently in perfect health for two years; but afterwards, through mere poverty, his health seemed to decline; the symptoms of stone returned, though none could be found upon searching; the orifice above the pubes again burst open, and he continues still to discharge part of his urine through it.

In November 1791, I was sent for to visit J. P. a man of seventy-two years of age, labouring under symptoms of stone in the bladder. The stone was distinctly felt on sounding; and having operated upon him, after the necessary preparation, took from him two stones, each about the size of small pigeon's eggs, and both having prominent points rounded seemingly by turning upon each other. The whole was

finished in five minutes, though a large vessel was taken up during the operation. The hæmorrhage, however, continued copious, notwithstanding all that could be done. The canula surrounded with caddice, and filled with styptic powder as formerly recommended, was introduced, and he had a draught with thirty-five drops of laudanum. The hæmorrhage continued for eight hours with equal violence. The bed-clothes were then taken off, the windows thrown open, and many cloths, dipped in a mixture of equal parts of vinegar and water, applied to the small of his back, by which the bleeding stopped in two hours, but left him extremely weakened, infomuch that his pulse was scarcely to be felt. An English blanket was then thrown over him, the windows put down, and he had another draught. Next morning his natural heat had returned, though his pulse was still extremely weak ; he had some panada with a little wine ; and, as the hæmorrhage was now entirely stopped, the wet clothes were taken away from his back, and he had another blanket. At night he had another draught, and slept well ; his colour and pulse gradually returned ; and in three weeks from the performance of the operation he was perfectly recovered, without any other medicine excepting a single injection. His diet was nourishing as well as his drink. This patient is by

profession a porter, and since his cure continues to follow that laborious employment without feeling any inconvenience. He seems not to have been sensible of any detriment from the great loss of blood he sustained; and declares, that if he were to be attacked with a fit of the stone over night, he would send for me next morning to perform the operation; for, that the pain he suffered from the latter was not to be compared to one day's suffering from the disease.

Mr B-----, aged sixty-six, had for
 twelve years been severely afflicted with XXI.
 pain in making water, sudden stoppages of urine when flowing in a full stream, so that it passed only by drops; severe tenesmus, and strong pressure downwards, by which the pain which he commonly felt in the neck of the bladder, and shooting from thence to the point of the penis, was so much augmented, that he could not refrain crying out, as he himself said, like a woman in labour. At the time I saw him, he had laboured under a severe fit of the stone for eight weeks, unable to retain his urine for half an hour at a time; every attempt to void it being likewise attended with excruciating pain. By the long continuance of this tormenting disease he was become quite emaciated; his appetite being
so

so completely gone, that he became sick at the sight of animal food ; and, if persuaded to swallow any of it, immediately threw it up with every thing else in his stomach. In this case I saw evidently that the patient had no chance of recovery even by the operation, and told his family so. The only thing that could be done was to attempt to relieve the present distressing symptoms, and then recover the tone of his stomach before he underwent the operation ; but so great was his agony, that he insisted upon its being performed immediately. It accordingly was so in two days after ; but, as the stone was very large, and happened to be laid hold of in a wrong way, it slipped twice out of the forceps, but the third time it came away with more ease than could have been expected, considering its size ; and the whole operation did not take up above seven minutes. A considerable blood-vessel was taken up during the time of it ; but the patient suffered nothing that could reasonably be supposed to hurt him. He had an opiate immediately on being put to bed, and the same repeated every night, with a common injection given every second day. For the first eight days he had not the smallest pain, and voided water copiously by the wound, but still had nausea and vomiting upon taking any solid food, so that the only food he took was panada mixed with

with a little wine or spirits ; and, after the first week, began to nauseate these also. From the time of the operation to this, the frequency of his pulse had decreased ; but now it increased from eighty-six to 100 ; symptoms of extreme debility at the same time came on, and in ten days he died. For three days before his death nothing would stay on his stomach but ardent spirits. He was now fully sensible of his own situation ; and frequently owned, in presence of his friends, that, if the operation had been performed before the last very severe attack, he believed he would have recovered ; but that, by delaying it till then, he had destroyed himself.

J. R. a shoe-maker, aged twenty-three, XXII. had symptoms of a calculus almost from his childhood, *viz.* stoppage of water, pain at the neck of the bladder, reaching to the point of the penis, urine frequently tinged with blood, and, when cold, depositing a great quantity of reddish coloured sediment. The stone was distinctly felt ; and, after proper preparation by warm bathing, purging, and injections, the operation was performed, and a small stone extracted, the whole being over in five minutes. The patient lost a considerable quantity of blood, notwithstanding which he bore the operation well. Some febrile symptoms afterwards appeared, but they

they were quickly subdued by a few antiphlogistic remedies ; and by the further use of an injection and purgative, he was entirely freed from his complaints, and dismissed cured in three weeks from the time of the operation,

Another patient of thirty years of age, who had been affected much in the same way for nine years and an half, had not such an happy termination to the disease. After proper preparation, I took away from him a large stone, the surface of which was very rough, and furnished with a number of sharp spiculæ. An artery was taken up during the operation; he lost a considerable quantity of blood, and it was found necessary to apply the silver canula formerly described, to prevent any of the extravated blood from getting into the bladder. On the morrow the patient began to complain of pain and fulness in the lower part of the belly, which was relieved by an injection ; but, on the fourth day after the operation, he was seized with violent vomiting, which continued all night, and he died next forenoon at eleven o'clock.

On opening the body, a considerable quantity of high-coloured fluid, evidently of an urinous nature, was found in the abdomen ; the small intestines and colon were slightly inflamed, and
much

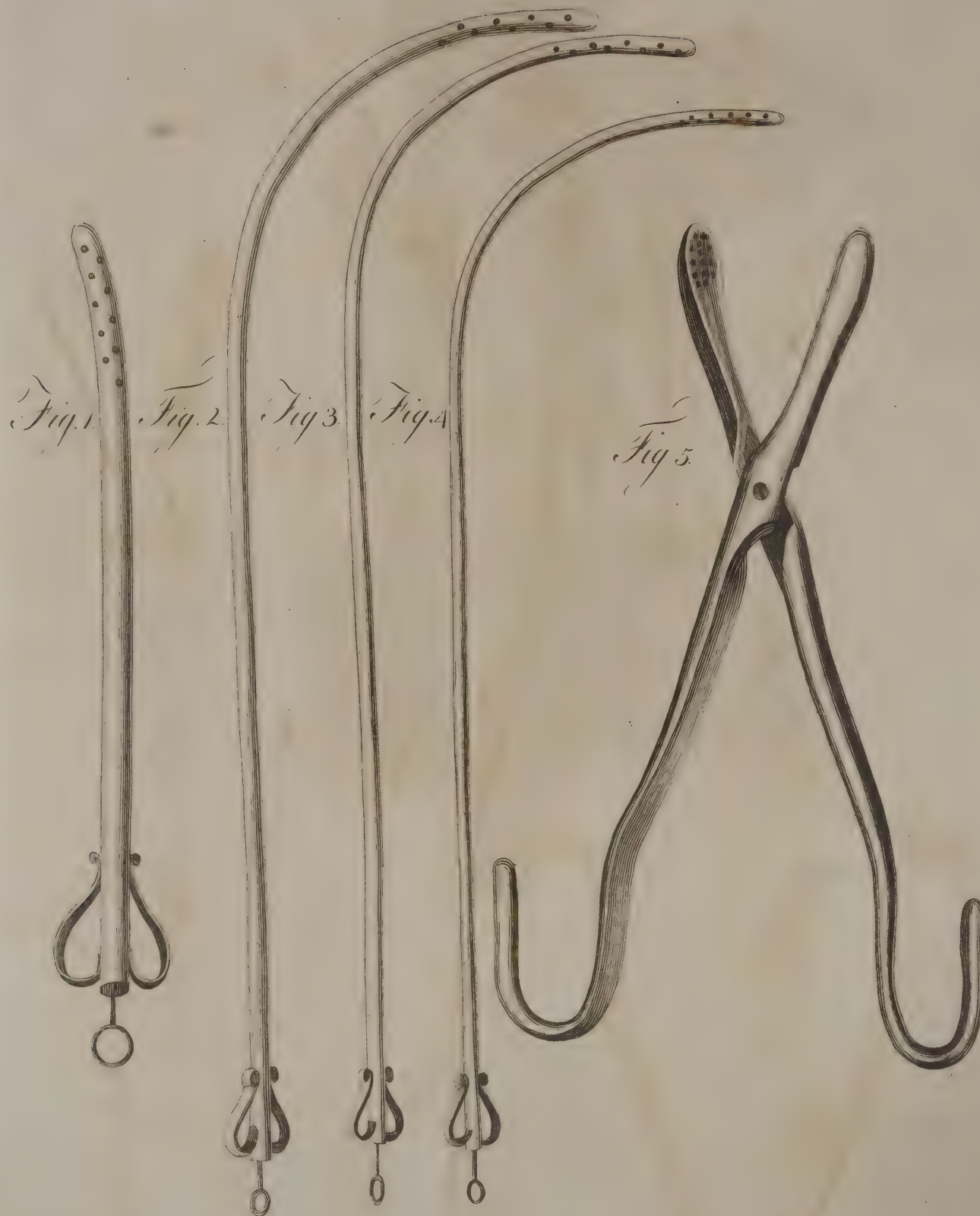
much distended with air; the bladder was not less than half an inch in thickness, besides being greatly enlarged in capacity; and, directly in the middle of the fundus, was a small opening; but for about half an inch round this opening, making a circular space of an inch diameter, the whole substance of it seemed to have been as it were dissolved by suppuration, except the external and internal coats. For eight weeks before the operation, this patient had not been able to retain his water for five minutes; so that the bladder must undoubtedly have been in a state of high inflammation, and the suppuration already begun was most probably hastened by the operation.

P. D. aged thirty-five, had laboured under symptoms of the stone for ten XXIII. years, but, till two months before I saw him, had been able to follow his usual occupation as a labourer. The next day I performed the operation; an artery was secured by means of the tenaculum, but very little blood was lost; the stone was of no great size, but very rough. He slept well, but on the morrow a quantity of coagulated blood came away with the urine; he had some febrile symptoms, (for which he was bled to six ounces); and early on the fourth morning he began to complain of great pain throughout the whole canal of the urethra, which

which was soon followed by a discharge of blood to a considerable quantity, both by the wound and urethra. In a little time the pain in the urethra went off, but the discharge of blood continued. He was ordered cream of tartar whey for his ordinary drink; had an injection which did not operate well; had some slight shiverings, which, however, went off in a short time, and he felt himself quite well, though his urine still retained a bloody tinge. This patient appears to have been naturally costive, and several doses of infusion of tamarinds, with a large quantity of senna, were necessary before he could be thoroughly loosened. The urine was discharged entirely by the wound for a longer time than usual; and once, when I was present, two fleshy masses came away along with it, and at another time some coagulated blood. A few days before his dismissal, he complained of sickness at stomach, which was relieved by a vomit of ipecacuanha. The cure was completed in about four weeks.

From the histories of the above cases, it is evident that the operation of lithotomy, when skilfully performed, is far from being attended with such danger as is commonly imagined; though indeed, perhaps, more depends in this case on the skill and dexterity of the operator, than in any other operation in surgery. From
some

some of the above narrated cases it appears, that even surgeons of long standing and experience may be deceived in finding the stone, though large enough to occasion the most violent symptoms. Where this mistake unfortunately occurs, the poor patient is the sufferer; and there can not be any doubt, that where the operation has been performed soon after, and likewise in an unartful manner, the consequence must be death. To causes of this kind, I think it is obvious that we must ascribe the many unfortunate events which attend the operation of lithotomy; and I am sorry to say, that, notwithstanding the great advances of late made in surgery, both in theory and practice, I have very seldom, perhaps not above once or twice in my life, seen it performed with the requisite dexterity; and, to the gentleman who did thus perform it, I certainly look upon myself indebted in a great measure for whatever degree of skill I possess, and for the extraordinary success which has hitherto attended me in the performance of the operation. In the four patients who died, and whose cases are related in the foregoing histories, it must be evident to every uprejudiced reader, that their deaths cannot be ascribed, in any manner of way, to the operation. It is plain that the mere circumstance of age is not any obstacle to success in lithotomy. One of the patients indeed, who





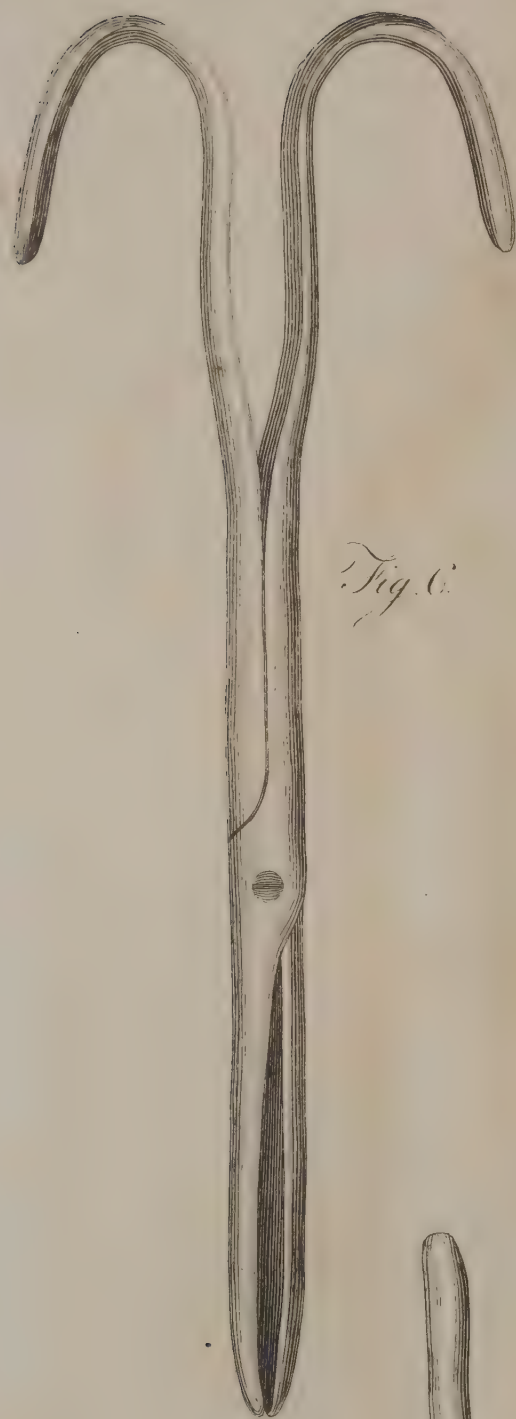


Fig. 6.

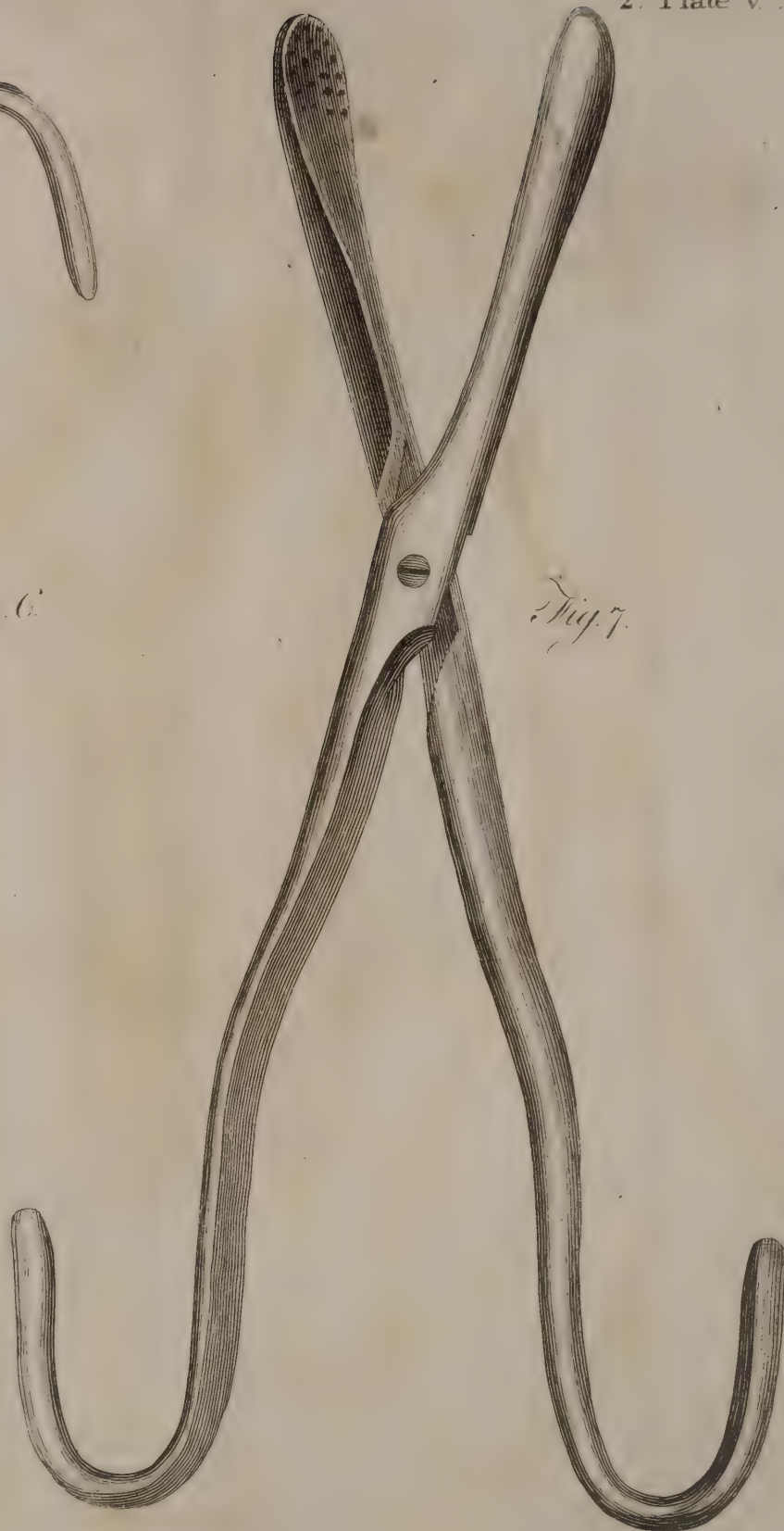
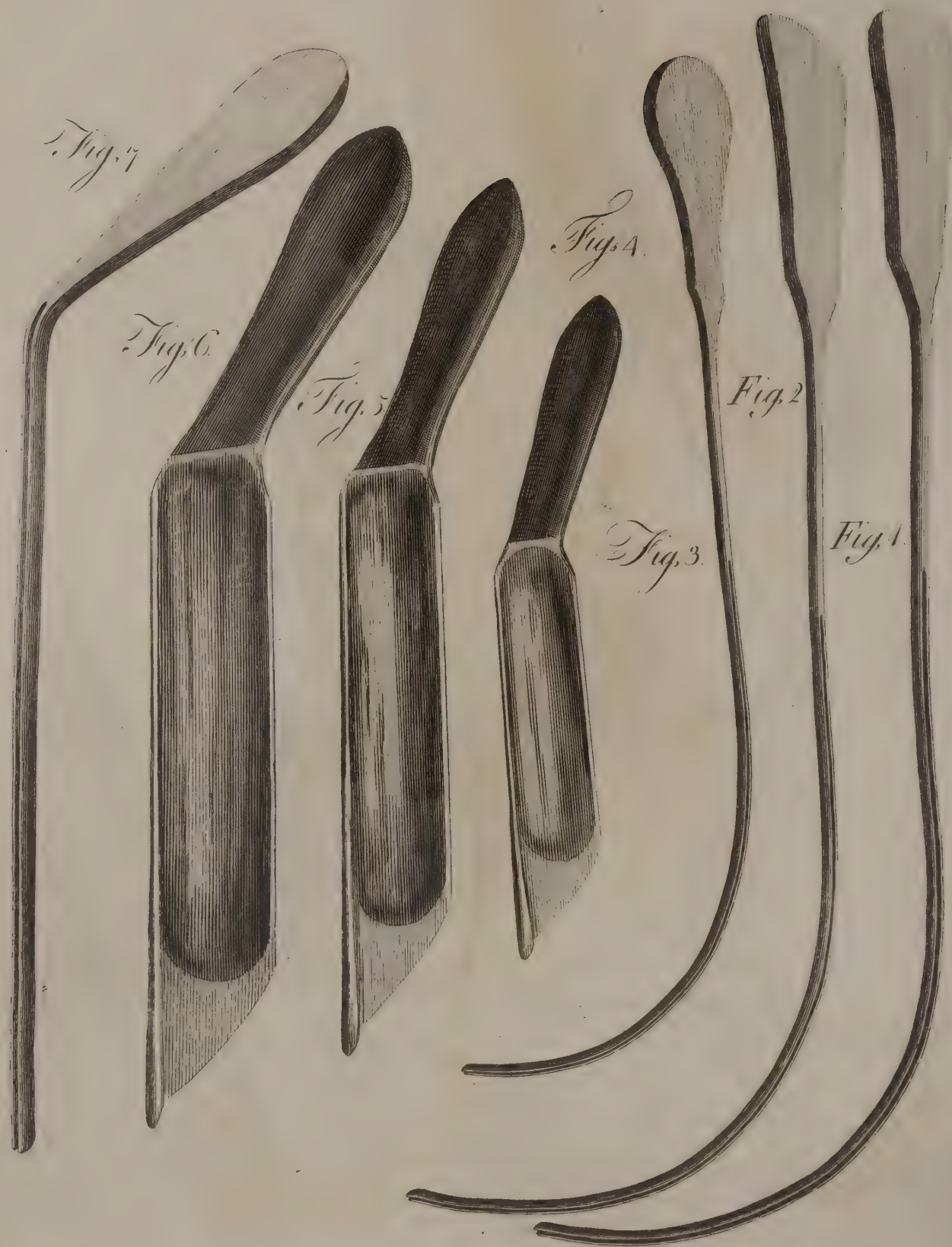


Fig. 7.



BACK OF FOLDOUT

who died, was seventy-six years old, but he was already reduced, and his health entirely gone. Another of seventy-two, but who was otherwise in health, recovered, while a third of only sixty-six died, being likewise previously deprived of that degree of health, and *vis vitæ*, which is necessary for a recovery. In short, where proper attention is paid to the health of the patient, and due methods taken to strengthen and enable him to undergo the shock which every injury to the continuity of parts must give to the human frame, I cannot think but lithotomy may be performed with as great safety as almost any operation in surgery. Were it necessary, I could give the histories of a number of other cases, where I operated with success; the patients being from five to forty years of age; none of them longer under the operation than from four to six minutes; none had occasion for any other medicine than an anodyne for the first three days, and a common injection afterwards. Those which are above related, however, I hope are sufficient to show the propriety of the method of operating, and rules for managing the patient above laid down, and how little reason there is to fear any bad accident, if these rules are adhered to.

